

# THE IRON AGE

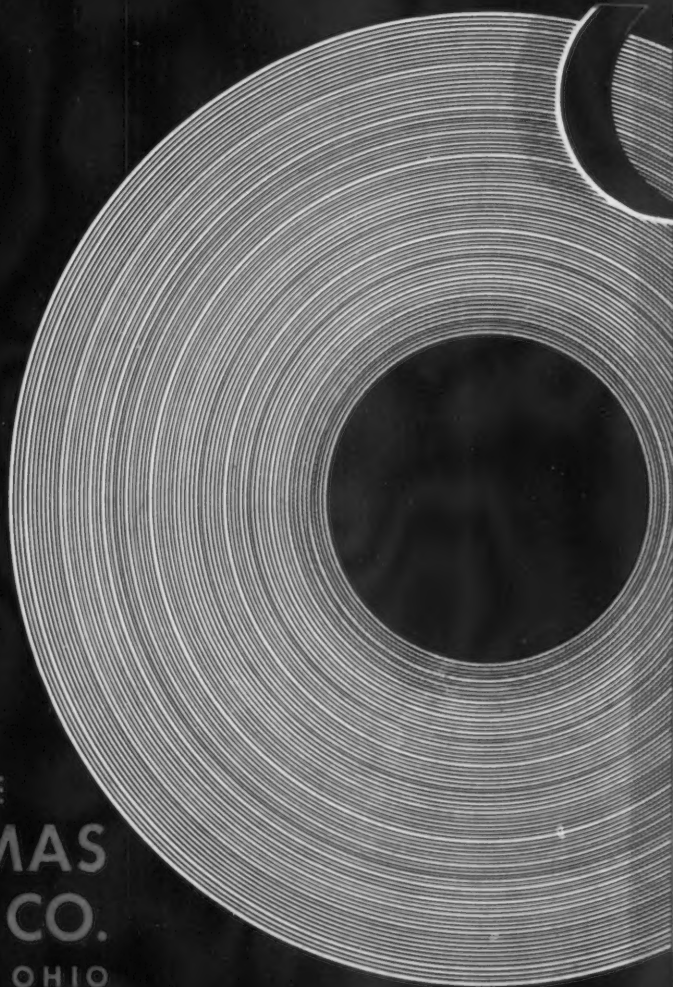
DUCTION -- MANAGEMENT

FEBRUARY 22, 1934

PROCESSES -- NEWS

## Thomas Strip

BETTER QUALITY  
MODERN FINISHES  
FOR YOUR PRODUCT  
AT LOW COST



COLD ROLLED

STRIP  STEEL

Bright Finish or Electro  
Coated with zinc or copper

EVER increasing is the number of products made of Thomastrip. The advantages of fast, continuous production—the advantages of gauge and size accuracy—the advantages of dense, uniform and attractive coatings which will not crack or peel from the steel under deep drawing and forming operations—all meet the requirements of today for a material that will add to product quality and salability at low cost. Investigate Thomastrip. A Thomas representative will gladly cooperate without obligation.

THE  
**THOMAS  
STEEL CO.**  
WARREN, OHIO

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

# REPUBLIC ELECTRIC WELD PIPE

*Ideal*  
**FOR  
MECHANICAL  
USES**



If you are looking for a way to improve the quality of your product or to reduce its cost without depreciating its serviceability, give a little thought to the idea of using Republic Electric Weld Pipe for those parts requiring tubular sections.

Many manufacturers have found it profitable to use Republic Electric Weld Pipe instead of castings, forgings and machined parts—have shown real production savings in the elimination of patterns and dies and in the reduction of machining costs.

Briefly, these are the qualities that make this new pipe adaptable to mechanical applications: a weld as strong as the wall at any other point—uniform inside and outside diameters—uniform wall thickness—perfect concentricity—uniform grain struc-

ture of the metal—freedom from scale, giving a clean, smooth surface both inside and out.

Look over the various parts of the devices you manufacture with a view to fitting these qualities into your parts requirements. Outline your specific applications and let us make recommendations.

**REPUBLIC STEEL  
CORPORATION**  
GENERAL OFFICES: YOUNGSTOWN, OHIO



# .. THE IRON AGE .. February 22, 1934 ..

J. H. VAN DEVENTER <i>Editor</i>	G. L. LACHER <i>Managing Editor</i>	W. W. MACON <i>Consulting Editor</i>	T. H. GERKEN <i>News Editor</i>	R. E. MILLER <i>Machinery Editor</i>
F. J. WINTERS    T. W. LIPPETT	G. EHRLSTROM, JR. <i>Pittsburgh</i>	BURNHAM FINNEY <i>Detroit</i>	GERARD FRAZER <i>Boston</i>	
F. L. PRENTISS <i>Cleveland</i>	R. A. FISKE <i>Chicago</i>	A. I. FINDLEY <i>Editor Emeritus</i>	L. W. MOFFETT <i>Washington</i>	R. G. MCINTOSH <i>Cincinnati</i>



## Contents

Let's Examine the Price Record .....	13
Forging Rustless Steel .....	14
Effect of Facing on Quenching Efficiency .....	16
Making New Type Steel Barrels .....	18
Analysis of Hard Metal Carbide Theory .....	21
Porcelain Enamels on Metal Murals .....	24
Speeds With the Automatic Sheet Catcher .....	26
Jobbing Shop for Heat Treating .....	29
New Equipment .....	32
News .....	35
Personals and Obituaries .....	37
Washington News .....	39
Automotive Industry .....	43
Markets .....	45
Construction and Equipment Buying .....	62
Products Advertised .....	80
Index to Advertisers .....	98



### THE IRON AGE PUBLISHING COMPANY

F. J. FRANK, *President*    G. H. GRIFFITHS, *Secretary*    C. S. BAUR, *General Advertising Manager*

*PUBLICATION OFFICE: N. W. Corner Chestnut and 56th Sts., Philadelphia, Pa.*

*EXECUTIVE OFFICES: 239 West 39th St., New York, N. Y., U. S. A.*

Member, Audit Bureau of Circulations  
Member, Associated Business Papers

Published every Thursday. Subscription Price:  
United States and Possessions, Mexico, Cuba,  
\$6.00; Canada, \$8.50, including duty; Foreign  
\$12.00 a year. Single Copy 25 Cents

Cable Address, "Ironage, N. Y."

#### ADVERTISING STAFF

Emerson Findley, 311 Union Bldg., Cleveland  
B. L. Herman, 675 Delaware Ave., Buffalo, N. Y.  
H. K. Hottenstein, 802 Otis Bldg., Chicago  
Pelce Lewis, 7310 Woodward Ave., Detroit  
Charles Lundberg, Chilton Bldg., Chestnut &  
56th Sts., Philadelphia, Pa.  
C. H. Ober, 239 West 39th St., New York  
W. B. Robinson, 428 Park Bldg., Pittsburgh  
W. C. Sweetser, 239 West 39th St., New York  
D. C. Warren, P. O. Box 81, Hartford, Conn.

SEVENTY-NINTH YEAR OF SERVICE TO THE METAL WORKING INDUSTRY



# What's New?



**B**BETTER products — improved production methods—lower costs—and through it all, the newer steels and allied lines are playing an important part. Can some of the new developments save for you? Put the problem up to Ryerson. We shall be glad to check up for you.

## That New V. D. Tool Steel is a Remarkable Product

**V. D.** is without doubt the most outstanding tool steel product developed in recent years. This is not only our own opinion but also that of many tool and die shops and manufacturing plants throughout the country.

V. D. has shown some remarkable results. The new revolutionary manufacturing process produces a hard, tough, yet easily machinable tool steel. Used where high quality, uniform, water hardening carbon steels are needed. Let us send you a sample for testing.

## A New Shock Steel for Heavy Duty Tools

**T**HIS special heavy duty alloy tool steel is giving unusual satisfaction to users. It lends itself not only to cold work, but also to hot working applications.

"Shock Steel" conforms to the rigid Ryerson standards of quality and uniformity. When annealed it will machine without difficulty. Used for severe hot and cold punching, hot and cold shearing and hot bending operations; for pneumatic chisels, concrete busters, track tools and where extreme shock and heavy service are encountered.

## Eraydo—the Zinc Alloy with Strength Added—

**E**RAYDO is a zinc base alloy using silver and copper in carefully determined proportions to give the greatest strength without loss of ductility. It is a tough metal with greater stiffness and rigidity than commercial zinc. It is non-rusting, non-magnetic—can be bent, formed, stamped, drawn and spun; solders easily, spot welds; can be etched, enameled—lacquered or plated. It is a low price, non-rusting white metal.

## New Steel Book

-- Just Out



**M**ORE than 200 pages of information on steel that is ready for immediate shipment. If you haven't already received a copy of this new Ryerson Stock List, a post card will bring it by return mail. Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

## Sheets to Withstand That Abrasive Wear

**H**ERE are sheets and plates manufactured from an entirely new type of steel for the express purpose of abrasion resistance. Tests indicate that this steel will outlast ordinary steel many times and in certain cases it has proved better than expensive high manganese castings. Used for such applications as scraper blades, concrete mixers, conveyors, hammer mills, drag line equipment, etc. Tell us your abrasion problem. We will be glad to give detailed data on the use of this new alloy.

## Now—Better Machinability in Stainless Castings

**S**TAINLESS 18-8 castings have always been difficult to machine, polish and grind. Now by a new process and by the addition of special elements, it is possible to produce castings that work much more freely. Considerable saving is effected in machine work time, in grinding and in polishing. Valves and wearing surfaces so cast are comparatively free from any tendency to seize or gall. Let a Ryerson specialist tell you more about this new development.

# RYERSON



# ▲▲▲ THE IRON AGE ▲▲▲

ESTABLISHED 1855

FEBRUARY 22, 1934

Vol. 133, No. 8

## Let's Examine the Price Record

▼▼▼

**T**HERE is a quite general belief that the farmer, in comparison with the maker of industrial products, has taken a severe price beating. There is also an opinion held in some quarters that steel and metal product prices are relatively high.

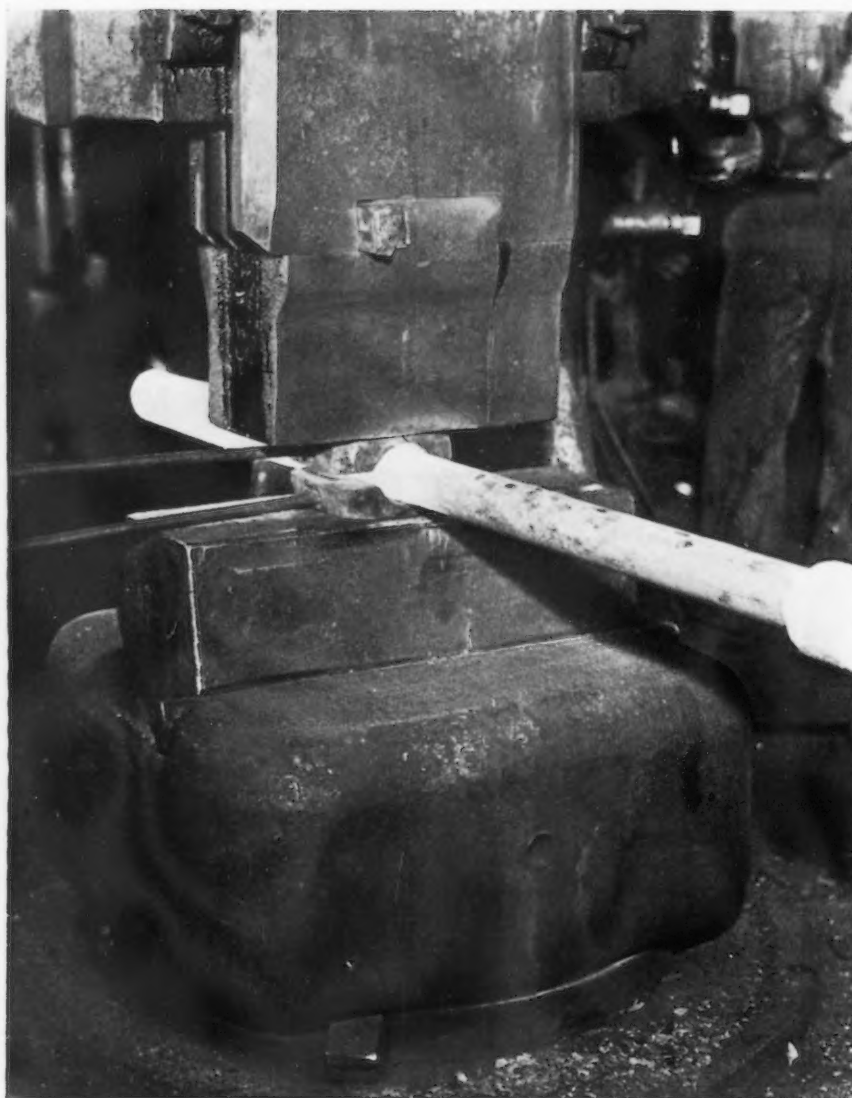
How far one can fall usually depends upon how high one tries to climb. This fact is not always kept in mind in thinking of relative price situations and is obscured by the statistician's choice of a single year, such as 1926, in which to strike a price level.

The last normal long-term period that we have known ended in 1915, before the artificial stimulus of the World War sent prices kiting. Agricultural prices have indeed fallen far from their war-time high levels. But on Feb. 3, 1934, farm prices, as reported by the official Government statistics, were but 4.3 per cent lower than the average of farm prices from 1900 to 1915 inclusive. Metals and metal products, on Feb. 3, 1934, were 5.2 per cent under their average for the same 16-year pre-war period.

These facts may surprise many members of Congress, the Federal Trade Commission and others who are now attacking our present steel price structure. Finished steel price averages, by the way, coincide from year to year very closely with the group "Metals and Metal Products," referred to above.

The metal-working industry wants to see the farmer get more for his farm crops, for then he will buy more steel, machinery and metal products. But the metal-working industry does not relish the injustice of being misinterpreted by uninformed public and private spokesmen. It is *not* in a preferential price position. On the contrary, it has had a more severe spanking than has the farmer.

*J. W. Van Hook*



Forging temperatures are held within close limits. Overheating causes the metal to crumble and low forging temperatures often result in cracked forgings. ▲ ▲ ▲

# Forging Rustless Steel

• • •

---

By ROGERS A. FISKE  
Western Editor, The Iron Age

---

**T**HE practice of forging stainless steel at the plant of Charles E. Larson & Sons, Inc., Chicago, has resolved itself into a program of education. Every man in the shop has had to learn that the principal factor in forging stainless steel lies in holding close to a few simple rules. There is, of necessity, close inspection before forgings leave the shop, but in addition, each workman is in effect an inspector of his work in process.

Such individual care is important because the plant is a jobbing shop which takes all classes of work not adaptable to quantity production. Individual forgings range in weight from a few ounces each to 600 lbs. each. Many orders are for experimental purposes; in other words, the forgings are subjected to trials and, if shown to be satisfactory, later go into quantity production and therefore out of the realm of the Larson shop.

The price of stainless steel makes it

imperative that stock be cut to length so there is minimum wastage. Weights must be accurately calculated, especially if the forge shop is furnished with billets by the buyer of forgings, who naturally expects to receive a stated number of forgings in return. If the shop orders the stainless steel it has the alternative of cutting the billets to length, usually on a cold saw, or of buying them cut to length at extra cost. The advantage of cutting to length in the shop is that a trial piece may be cut and forged, thereby checking calculations and so reducing the possibility of errors either in calculations or in ordering. Practice at this shop leads to the conclusion that a saw is a good investment which will soon pay out.

Shop experience has taught that billets should be rough-turned and freed from defects before delivery to the forge plant. A further inspection should be made upon receipt of the

steel to avoid placing defective billets in the furnace only to have the forged product thrown out after the expenditure of much shop labor and other costs.

It is essential in forging stainless steel to make certain that billets are heated slowly and as uniformly as possible. To attain these results furnaces are classified as low heat, or preheating furnaces and high-heat furnaces.

The preheating furnaces are located at the receiving end of the shop. All pieces to be forged are there brought up slowly to temperatures that range between 1400 and 1500 deg. F. If the piece or billet is extra large it is put in a cold preheating furnace. This is then lighted and the temperature of the billet is brought up with the furnace. Oil and gas are the fuels commonly used throughout this shop.

A high-heat furnace is located near

each hammer. Pieces of steel or billets that have been brought up to the desired temperature in the preheating furnace are quickly transported to a high-heat furnace, where the temperature is raised within the limits of 1800 to 2000 deg. F. Here again careful watch is kept on the rate of heating and on the maximum temperature attained. Heating at too rapid a rate may result in a cracked forging.

A part raised to too high a temperature results in crumbling, while steel forged below 1700 deg. F. is likely to develop cracks. Most sizes of forgings can be worked to desired size and shape in one heat. However, the hammer men are charged with the responsibility of turning out a first class product and they know it is preferable to reheat rather than to work below a given temperature.

Some forgings can be made by passing billets through the preheating and high-heat furnaces. They are then hot-cut to size on the hammers, after which the cut pieces are returned to the high-heat furnaces to assure proper temperature before forging. As an example of heating time needed, a 4-in. x 4-in. billet requires 4 to 5 hr. to pass through the preheating stage.

As a general rule stainless steel is hammer-worked less vigorously than most ordinary grades of steel. More and lighter strokes are the rule. Even though forging temperature is correct, a stainless steel forging can be ruined by working it too hard. Forging dies in a shop of this kind are not complicated. Die materials and designs conform to the standard practice with other steels. Billets follow the same general rules.

The buyer should remember in specifying stainless steel forgings that one of the important reasons for using



Light and frequent strokes of the hammer result in first quality forgings.

stainless steel is to obtain the finish that can be given to it. Therefore, when figuring the forging dimensions, a little more metal must be left than in the case of carbon steels to make sure that the machine shop will get below all pitting and all scale that may have been hammered into the surface: If this point is watched, stainless steel forgings can be machined so that resulting surfaces will meet all expectations. This shop finds that stainless steel, if properly worked, has no more forging limita-

tions than ordinary carbon steel.

After being forged, some parts are annealed, others heat-treated, according to required specifications. This process follows the usual practice of placing the parts in containers, which are then filled with charcoal and sealed. Temperatures range between 1450 and 1500 deg. F. The part may be left to cool down with the furnace, or it may be drawn in the furnace and then air-cooled, depending on the specifications of the buyer. An oil quench is preferred for heat treating.

(At Right) Sufficient metal must be provided so the machine shop can hold dimensions after cutting below scale and pitting. The forging (below) at the right was worked either too hard or at too low a temperature. Note defect where part was countersunk for turning.





# Effect of

By SEIKICHI SATO  
Tohoku Imperial University

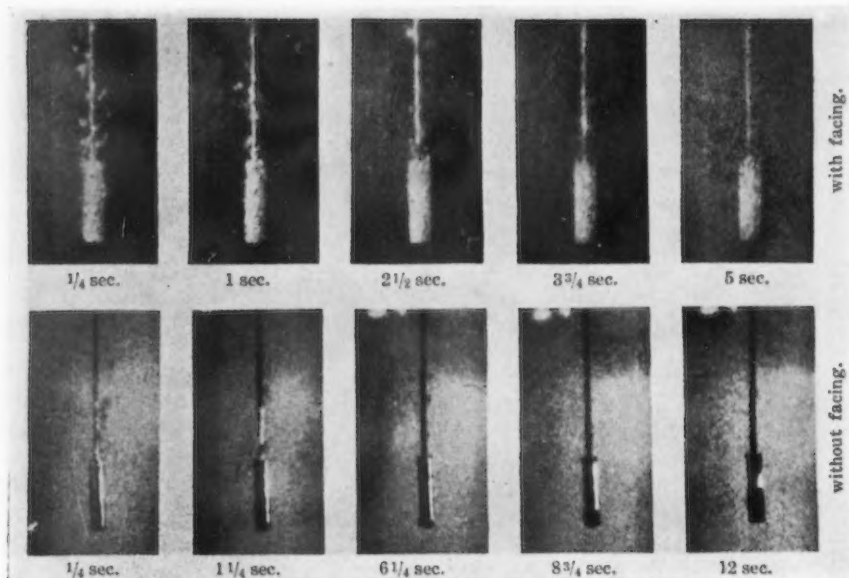


Fig. 1—Steel samples, with and without facing, during quenching in transformer oil at 20 deg. C. The lower view shows how the vapor envelope inhibits the cooling. ▲ ▲ ▲

FOR the purpose of comparing the cooling velocities of a specimen during quenching, apparatus was designed and constructed to permit automatic recording of temperature-time curves. The apparatus is similar to the author's self-recording dilatometer constructed about four years ago. The specimens were heated electrically, the coolants were stirred automatically, and all temperature variations were mechanically reproduced.

For the quenching specimen it is very important to have a constant surface condition which will not vary during repeated heatings and quenchings in various cooling liquids. An alloy—60 per cent Fe, 20 Ni, and 20 Cr—was finally selected since it is austenitic and very stable at very high or very low temperatures. After the surface of the specimen was finished in the lathe, it was roughened by 90-mesh carborundum powder mixed with water. This state of the surface is very important to obtain a firm adhesion for the facing material and, therefore, is taken as the standard surface condition, whether faced or unfaced, for quenching.

As a facing material, various substances such as "tonoko"—the very fine powder of a razor whetstone produced in Japan—alumina, silica, lime, magnesia, carborundum, alundum, fire clay, pumice stone, volcanic ash, molding sand, iron sand, glass, mica, coke, graphite, charcoal, sugar, sodium carbonate, water glass, borax, etc., either singly or a mixture of a number of them were tried. They were powdered (100 to 120 meshes), mixed with water, smeared on the surface of the specimen and then dried. About 70

kinds of facing materials were tested and the result was always to increase the cooling velocity of the specimen. It was also found that one of the most important conditions for a facing is the firm adhesion of the material, or the resistance to the peeling off caused by the sudden contraction during quenching. One of the most favorable mixtures which was found to be very effective, is:

Fire clay.....	75 gr.
Graphite .....	25 gr.
Tonoko .....	30 gr.
Borax (anhydrous)....	14 gr.
Water .....	200 cc.

In the case of steels, the surface should be freshly ground or machined as a rusty surface cannot hold the

mixture firmly enough to prevent it from being washed off during quenching.

## Behavior During Quenching

An unfaced specimen heated to a high temperature is, when quenched, at once covered with a vapor envelope formed by the cooling medium, and, as the vapor is a bar heat conductor, the cooling of the specimen is thereby greatly retarded until the envelope begins to break and a direct contact of the specimen with the cooling medium takes place. At this point an abrupt increase in the cooling velocity is indicated by a break in the temperature-time curve.

On the other hand, faced specimens

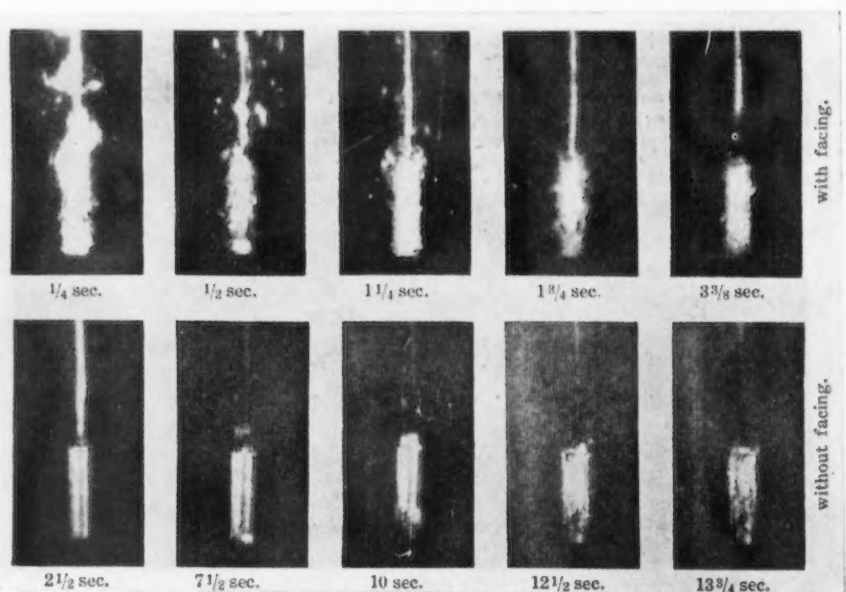


Fig. 2—Steel samples, with and without facing, during quenching in glycerine at 20 deg. C. The protective action of the vapor sheath around the unfaced specimen is apparent.

# Facing on Quenching Efficiency ▲ ▲ ▲

**A** RECENT mention of S. Satô's investigation regarding the practice of facing steels prior to quenching elicited considerable inquiry for additional information. The experimental procedure and results presented here are abstracted from the original research paper. This method of quenching has long been the practice of Japanese cutlery makers, and consists of coating or facing the surface of the specimen with a mixture of water and tonoko (very fine powder of a razor whetstone, a form of clay slate), and drying the specimen before quenching. Quenching of faced material results in more rapid cooling, which in turn produces a more dense and uniform steel structure.

are never enveloped by a vapor film, and, therefore, their cooling is very rapid and uniform throughout the specimen. This is the real reason that the old technique of facing before quenching is useful in imparting an intense and uniform hardening. The process is pictorially presented in Figs. 1 and 2.

The photographs clearly show that in the case of the faced specimen, there is always a direct contact between the headed "skin" of the specimen and the cooling medium, and the heat is consequently rapidly dissipated as seen in the vigorous vaporization around the specimen. Thus, in the case of quenching in transformer oil (Fig. 1), the cooling proceeds so quickly that the evolution of vapor bubbles has concluded after a lapse of only 5 sec.; that is, the temperature of the specimen falls from 800 deg. to below 200 deg. during that short time interval. In the case of the unfaced specimen a thin film of vapor is immediately formed around the heated specimen, and, therefore, its "skin" cannot come into direct contact with the cooling medium, and thus the heat loss of the specimen is greatly retarded.

The cooling retardation is of con-

siderable magnitude as shown in the lower row of photographs in Fig. 1. It takes about 6 sec. for the envelope to begin to break at the bottom, and 8 sec. at the top. The break, therefore, proceeds from both ends toward the middle. This break of the envelope, is, of course, accompanied by a direct contact of the cooling medium with the specimen, and, hence, an abrupt increase in cooling velocity begins to take place, as is shown by the break in the cooling curves in Figs. 3 and 4. The effect of the insulating film is even more pronounced in Fig. 2 which shows the faced and unfaced specimens being quenched in glycerine at 20 deg. C.

## Cooling Curves During Quenching

The cooling curves in Figs. 3 and 4 show that the difference in cooling velocity between the faced and unfaced specimens is especially great when they are quenched in hot water. When a faced specimen is cooled in water at 78 deg. C., the temperature is reduced to below 100 deg. within 4 sec. On the other hand, for as long as 3 sec., the unfaced specimens are still completely covered with a vapor envelope, though the rate of cooling is then gradually accelerated by the sub-

sequent fracture of the insulating film. A trace of the envelope, however, is still visible after a lapse of 9 sec.

To find the cooling behavior of faced and unfaced samples the standard specimen was inserted in the self-recording apparatus mentioned in the initial portion of this discussion. The sample was quenched from 800 deg. C. in various cooling liquids both with and without facing material, and the effect of the facing on the cooling velocity was examined by comparing the individual cooling curves obtained during quenching. The cooling liquids used included glycerine, various kinds of animal, vegetable and mineral oils, and water at various temperatures. The results are shown in Figs. 3 and 4 in which abscissa represents time in seconds and ordinates the temperatures in degrees centigrade.

It can be concluded from the figures that for an unfaced specimen when quenched, the rate of cooling is at first small until the temperature falls to a certain value, and then a sudden bend of the cooling curve takes place. This sluggishness of the initial part of the cooling curve usually fails to arrest the  $A_r$  change of steel occurring in the range 600 deg. to 500 deg.,

(Concluded on Page 68)

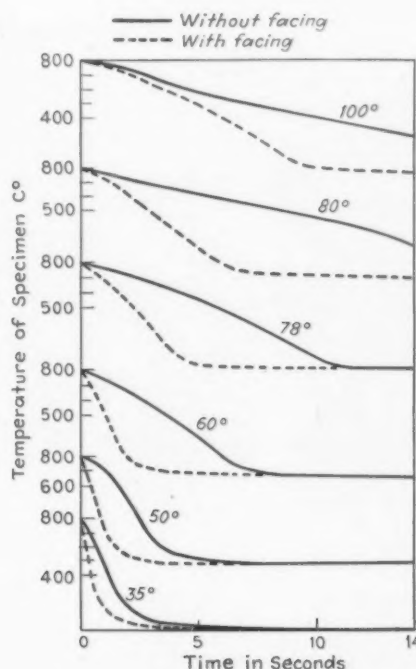


Fig. 3—Cooling curves (at left) of a steel sample during quenching in water at various temperatures.

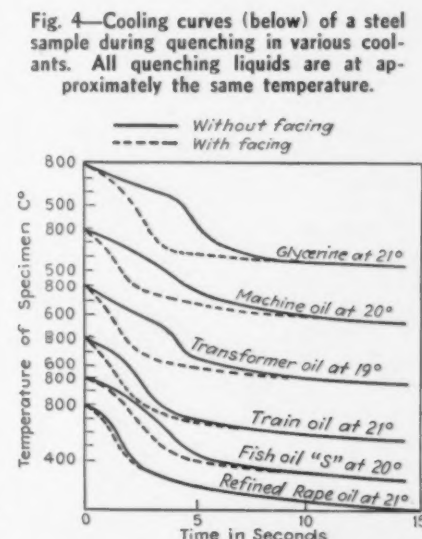


Fig. 4—Cooling curves (below) of a steel sample during quenching in various coolants. All quenching liquids are at approximately the same temperature.



# New Type of Steel Barrel and

By F. L. PRENTISS  
Cleveland Editor, The Iron Age

**T**HE ingenuity of many steel stamping plants has been turned in the past few months to the design and production of steel beer barrels. Various requirements have had to be met to produce containers that would appeal to breweries as suitable substitutes for wooden barrels. These include strength to withstand severe service, lightness, appearance, most suitable kind of steel to use, ease in handling, insulation and coating to prevent corrosion.

Closely coordinated with the development of barrels acceptable to the brewing industry have been the production problems covering design and methods of manufacturing, the most satisfactory solution of which would result in economies in manufacture.

Among the leaders of the list of makers of steel barrels is the Midland Steel Products Co., Cleveland. Design and production methods were developed in the Midland plant to produce a barrel that possesses the required

strength, is simple in design, has few parts and is made with simple operations. The principal operations are rolling, forming and stretching, these being operations that increase the tensile strength of the material.

The barrels differ in some of their essential features of design, fabrication and assembling from any others that are now being made and their manufacture includes various interesting forming, welding and assembling operations. Departing from the usual practice of applying a protective coating after the barrel is completely assembled, the shell, heads and other parts are coated after fabrication but before assembling.

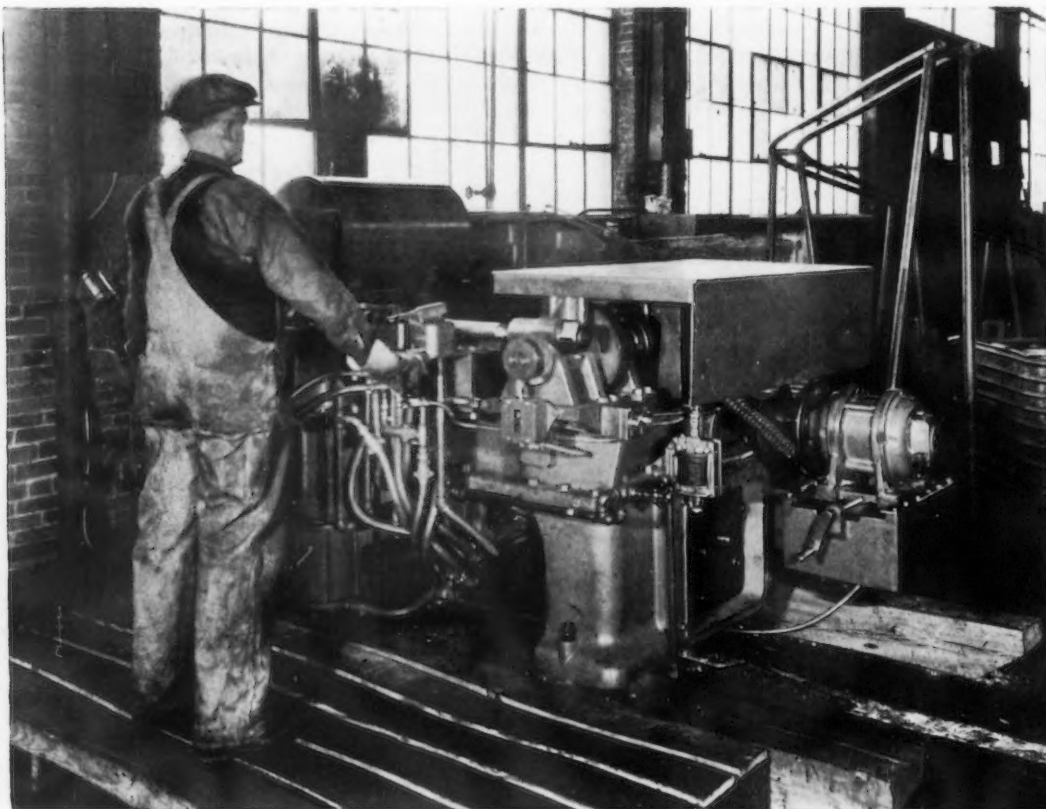
The barrel is made in both the single shell and in the insulated double shell types. The single wall type bar-

rel has only four parts aside from the bung and tap.

Steel beer barrels are either of the cup type made from two drawn bowl shaped half shells circumferentially butt welded at the bilge or of the cylindrical type with a one-piece shell having a longitudinal flash weld and the two heads welded to the shell. The latter manufacturing method is followed in the Midland plant.

The single shell barrels are made of SAE 1025 steel sheets, the shells of 14-gage and the heads of 13-gage material. An interesting feature in the design and method of construction is the provision of a wide protective band at the center of the barrel which is fastened to the barrel by an expanding operation. This reinforces the barrel sides. Beads which serve as rolling hoops and as a protective clearance for the bung are formed in this band.

The band is slipped over the shell and both are expanded. In this oper-



▲ ▲ ▲

The blank that becomes the shell of a beer barrel is rolled into a tubular form and the seam is longitudinally flash welded on the inside in a machine having a capacity for welding 200 shells an hour.





# Features of Its Manufacture

ation not only is the shell expanded to fit tightly against the band but there is sufficient additional expansion to stretch the band slightly. A bilge is formed in this operation and as the greatest diameter of the bilge is at the center of the band, welding of the band to the barrel is not required. Had the barrel been designed with two separate rolling hoops there would be two additional welding operations in fastening the hoops to the barrel and there would be the possibility of the weld giving way under severe handling service. The expansion of the shell of the barrel is  $\frac{5}{8}$  in. at the center and the expansion of the encircling band is 20 per cent of that of the shell. The expanding is done at a rate of 200 shells an hour on a cone type expanding machine built by Grot-nos Machine Co. This machine is also used for expanding a  $\frac{3}{4}$ -in. bilge on the double shell barrel.

Equipment for fabricating the barrels is arranged for consecutive operations in two rows at one side of the plant. First the shell blank is sheared to size and rolled into its tubular form. Then the seam is flash welded on a Taylor-Winfield flash welding machine which has a capacity for

**T**WO unusual designs of beer barrels are made by the Midland Steel Products Co., Cleveland. One is a single shell container and the other a double wall, insulated barrel. Accompanying sketches serve to indicate chief features of design and construction. Electric welding forms a large part in the manufacturing process, with flash, butt and seam welding included, and considerable production machinery built for the purpose.

welding 200 seams an hour. After welding the flash is trimmed both on the inside and outside by a Morton Mfg. Co. flash trimming machine.

The circular band is rolled to form, the ends welded together, the beads are formed on the band to form the rolling hoops and then the bung hole is perforated in the band on a punch press. The completed band is slipped over the shell after the latter has been welded and flash trimmed and the shell and band are then expanded in the operation previously mentioned.

After the band is joined to the shell by the expanding operation a hole in

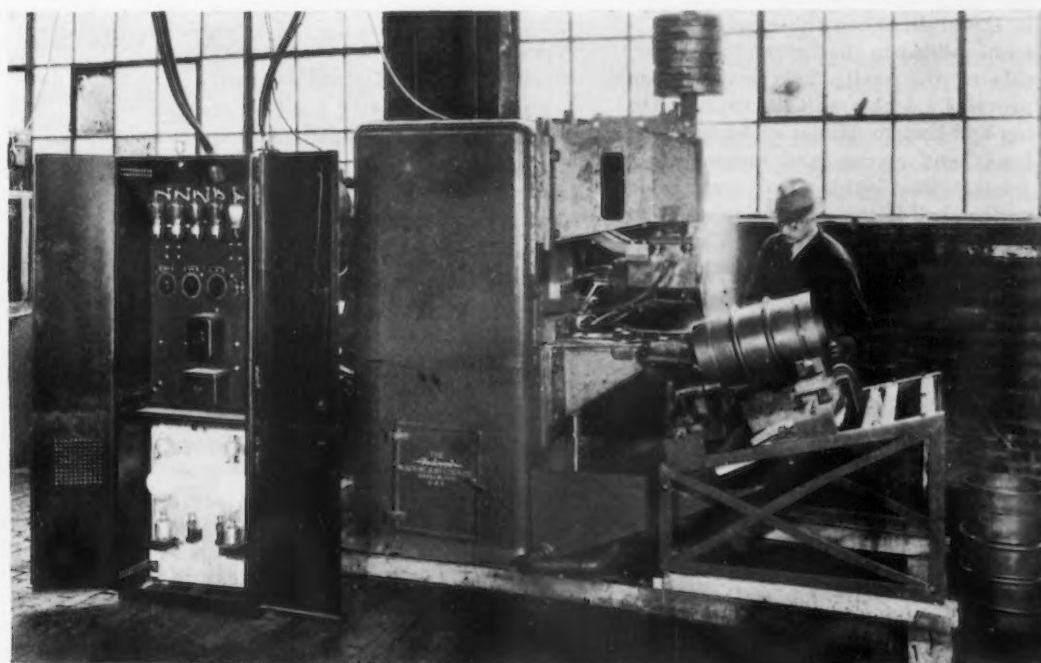
the shell for the bung is perforated and flanged, these operations being performed on two Bliss punch presses. The bung, which is a steel forging, is then fitted into the hole and the collar of the bung is spot welded on the outside to the barrel shell. This is done to locate the bung. Then the bung is welded on the inside. The crimped edge of the perforated bung hole fits against a recess in the bung forging, this recess is filled with the weld metal and the bung is welded flush to the inside of the barrel.

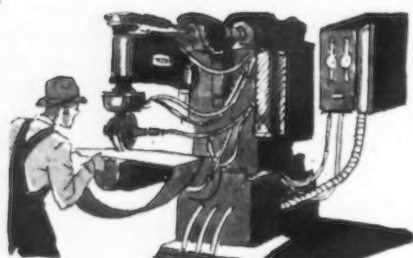
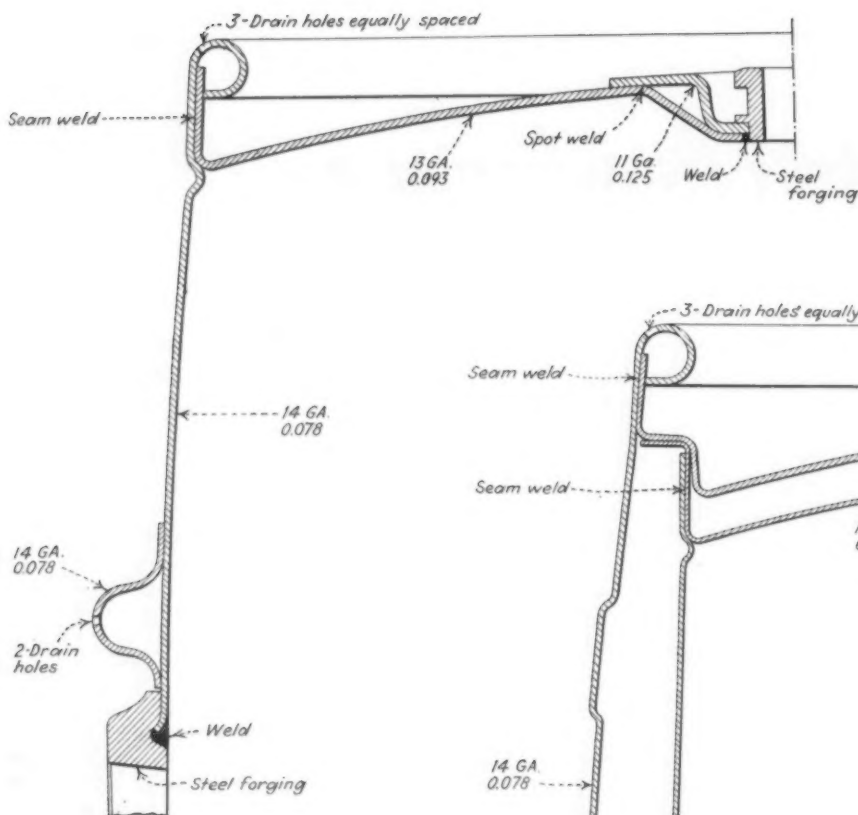
After the bung is welded on, beads are rolled in the circumference of the shell near the two ends. These beads are both for the purpose of providing locating points for the top and bottom heads of the barrel and to establish accurately the distance between the top and bottom heads and thus to control accurately the gallonage of the barrel. Gagings of some steel beer barrels now in use show that they vary considerably from rated capacities.

The top and bottom heads when formed are flanged outwardly and these are pressed upon the shell with a pneumatic press, the flange of the heads fitting tightly against the shell

▲ ▲ ▲

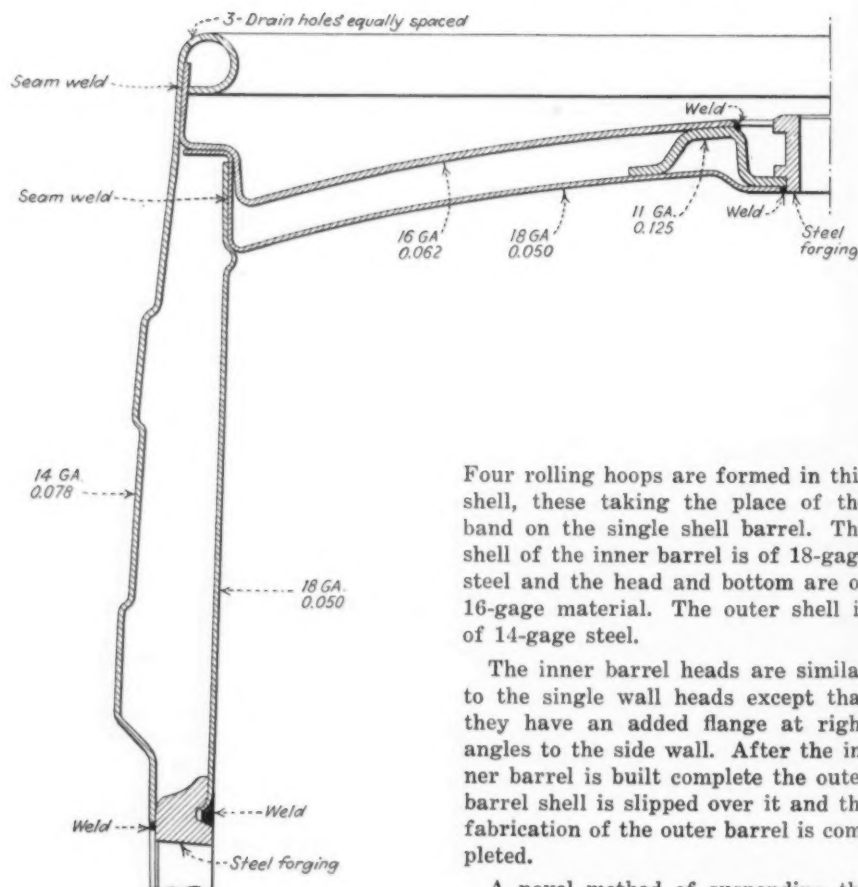
The heads are seam welded to the barrel on the outside on a resistance seam welding machine, the barrel revolving while this welding operation is being performed. This machine is equipped with a Thyatron control, the control apparatus of which is shown at the left.





and the head nesting against the bead in the shell. Then the head flange is seam welded to the barrel on the outside of the shell. This construction provides a double wall thickness in the top and bottom flanges or between the heads and chimes and insures tight joints. The longitudinal seam weld on the shell is the only inside weld except on the bung and tap. The seam welding of the top and bottom is performed on a resistance seam welding machine built by the Federal Machine & Welder Co. This machine is equipped with a Thyatron control. The barrel revolves while being welded. The machine is so controlled that there are 15 interruptions per lineal inch of weld with an average speed of  $\frac{1}{8}$  in. per min. The machine has the capacity to weld 60 in. per min.

The chimes are integral with the barrel shell. Forming the chimes by curling the ends of the shell inwardly



is done speedily in a special operation developed by the Midland company.

With the method of head construction followed the welding of separate chimes to the head is avoided. The inwardly curled chimes assure easy handling and gripping.

The double wall barrel is practically an inner and outer barrel. Construction of this barrel is essentially the same as that of the single shell barrel except that instead of curling the side walls of the inner barrel to form the chimes the side walls end above the head. By this method of construction the inner shell may be assembled and tested for leaks before it is assembled in the outer shell. This testing is done hydrostatically.

The outer shell is rolled into a cylinder and longitudinally flash welded the same as the single shell barrel.

The single wall barrel has beads around the girth, held to the shell by an expanding operation and serving as rolling hoops while at the same time providing clearance for the bung. The chimes, integral with the barrel shell, afford easy gripping hand-holds.

The double wall, insulated barrel, has four rolling hoops formed in the outer shell, and the design features an assembly calculated to remove suspension stresses from the welded joints at bung and tap.

Four rolling hoops are formed in this shell, these taking the place of the band on the single shell barrel. The shell of the inner barrel is of 18-gage steel and the head and bottom are of 16-gage material. The outer shell is of 14-gage steel.

The inner barrel heads are similar to the single wall heads except that they have an added flange at right angles to the side wall. After the inner barrel is built complete the outer barrel shell is slipped over it and the fabrication of the outer barrel is completed.

A novel method of suspending the inner barrel is accomplished by forming a secondary step flange in the outer head which permits the flange of the inner head to rest upon this secondary flange. With this construction a minimum amount of surface area of the inner shell is in contact with the outer shell. Both inner and outer heads are seam welded to their respective shells.

The outer shell is welded to the top of the bung, which is the same construction as that used for the single shell barrel and the outer head is welded to the top of the tap bushing flange. By this unique method of suspension stresses are removed from the welded joints at the bung and tap and the inner shell is held securely in place.

While the form of construction and suspension provide an absolutely airtight heat-insulating space between the shells, additional insulation is afforded by the use of a quilt of Cabots

(Concluded on Page 68)

# Analysis of Hard Metal Carbide Theory

By KARL SCHROETER

**T**HIS review of the various theories governing the formation and behavior of hard metal carbides is a continuation of the discussion which appeared in THE IRON AGE of Feb. 1. The concluding article of the series will be published in a succeeding issue, and will deal with the technique of machining glass and very hard and brittle alloys.

The author, who was the pioneer investigator of cemented tungsten carbides, herein reviews the known theories governing the internal behavior of aluminum and magnesium-silicon compounds, and attempts to expand those theories sufficiently to explain the action of the tungsten-cobalt system.

If finely granulated portions of tungsten and cobalt are mixed in proper proportions, highly compressed, and sintered in crucibles containing sufficient carbon to supply the system, the product is a cemented tungsten carbide. If the bars are fired for  $\frac{1}{2}$  hr. at 800 deg. C., the hardness increases, and as the temperature is elevated, the hardness increases steadily until about 1350 deg. C. is reached. The author attempts to analyze the action of this threshold temperature and explain the mechanism of the cementing action. He discusses the two alternatives, which consist of simply an extension of the low-temperature "cobalt" effect, or a formation of a new liquid phase which produces a molten sintering medium.



**H**ARD metal carbides, according to their industrial application, their structural formation, and the relation of their structures to their properties, appear to stand quite detached from other industrial alloys. They conform to laws entirely different from those governing other alloys. None of the experiences gained with the latter seem at present directly applicable to hard metal carbides.

In the previous article reference was made to the fact that the procedure which we know as applicable to aluminum alloys might throw light on the problem of hard metal carbides. Before going into further detail regarding this parallel and the experimental material leading to it, a review will be given of sintering procedure from a theoretical viewpoint. This review will include the early discoveries of the Americans, Merica, Waltenberg, and Scott<sup>1</sup>, the results of Wilen's work on duralumin, and the

conclusions of the most recent German researches.

In the duralumin process, the basic metal of the alloy during the refining-glowing stage absorbs certain amounts of the second constituent (copper) in solid solution which, upon aging, is precipitated out during the second step of the improvement process. It is indicated, therefore, that as a primary condition the glowing process is satisfactory only if it takes place above a certain temperature—namely, above the demixing temperature of the constituents. Between the glowing and the aging there occurs the cooling-off which is successful, particularly if the product is rapidly quenched. This results from the fact that the equilibrium condition of higher temperature is necessarily transferred to the aging temperature, which practically corresponds to the volume temperature (temperature when volume is maximum), so that there is then present a supersaturated

solid solution. In case the solubility of the constituents decreases with dropping temperature, slow separation can take place during aging. Improvement in this direction is, therefore, possible only in the case of such alloys which fulfill the condition of solubility depending on temperature, which can be considered as an indispensable condition of their constituents.

In the case of pure metals a similar improvement can be secured for the same reason. On the other hand, it is common knowledge that not only aluminum alloys show this phenomenon, but also the systems, copper-iron, lead-antimony, copper-zinc, iron-tungsten, etc., as Archer<sup>2</sup> proved in his valuable researches. Since aluminum free of silicon in alloy with magnesium can be improved with regard to physical properties, Archer concluded that the aluminum system is not similar to a magnesium-silicon compound, the separation of which conditions the hardening. It is probably a separation of the compound  $\text{Cu Al}_2$ , which is influenced by the magnesium, somewhat like a loosening-up of the aluminum screen with increased diffusion possibilities thereby made possible. The improvement of the mechanical properties, especially the increase in hardness, was for a long time difficult to imagine in detail, since very little was known regarding these conditions. It was formerly generally assumed that solid solutions were always harder than any one of their constituents. In view of recent developments, however, it is currently assumed that solid solutions, when they contain highly dispersed separations, represent a condition of even greater hardness than solutions in which the separations are not well dispersed. Seemingly the excess solution constituent at the lower aging temperature



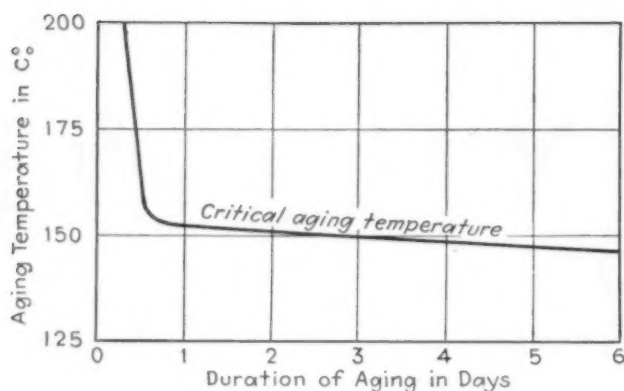


Fig. 1—Meissner's curve of the critical degree of dispersion showing the break in the curve at about 150 deg. C., which is valid for an aluminum alloy. This temperature is designated as the "critical aging temperature."

separates out. This separation probably occurs at the intergranular limits or in the crystal slip surfaces, thereby exerting a "braking" action which inhibits deformation of the solution by external forces. Naturally there is an optimum particle size with regard to the braking action as the particles exert no action if they are extremely small. The braking action will likewise become weaker when the small particles agglomerate into a comparatively few balls.

#### Relation of Dispersion Degree to Temperature

From the consideration along Jeffries and Archer<sup>3</sup> originally evolved the conception of the critical dispersion degree which sets in at an optimum temperature and best justifies the conditions mentioned above. Meissner<sup>4</sup> then produced curves for the critical dispersion degree which gave periods of time which are necessary for reaching the dispersion degree for any particular temperature. This graph is illustrated in Fig. 1, where aging temperatures are graphed as ordinates and the corresponding aging periods at which the critical degree of dispersion is reached are shown as abscissae. When these aging periods are overextended, as in the temperature period to the right above the curve, there reappears a deterioration of the physical properties of the solid solution. This conception is, therefore, entirely justified from a critical dispersion viewpoint. This curve is of additional interest and will be discussed later in connection with its actual use on hard metal carbides. The break at 150 deg. C., which the curve shows as valid for an aluminum alloy, is called the "critical aging temperature" by Meissner. Above this temperature the optimum aging is completed in less than a day, and below it the time is greater than one day.

The second deterioration of the properties which set in during too long an aging, as before mentioned, can then possibly be ascribed to an irregular course of the coagulation

due to too quick a maturing. From observations it is known that the separations finally become microscopically visible, after which no further peculiar alterations appear. At this point the alloys are of no particular practical use.

Regarding the chemical nature of the separation, Meissner's data have not been expanded sufficiently to permit a satisfactory explanation. Meissner<sup>5</sup> proved that magnesium alone facilitates the improvement of aluminum, and that silicon alone does not. An increase can be obtained, however, by additions of two constituents, for instance iron and silicon, or manganese and iron.

An important forward step in examination procedure resulted from the use of x-rays, by means of which a better understanding was possible concerning the correlation of mechanical characteristics and screen structures. Likewise, attempts were made to determine the alteration of granular size of the separated particles. An excellent work by Trettin<sup>6</sup> demonstrated that the sensitiveness of the x-ray method in general was not competent to detect the smallest amounts of separations. For this reason, numerous experiments concerning the separation of the supersaturated mixed crystals were fruitless until v. Goler and Sachs<sup>7</sup> ignored the crystals which separated and devoted considerable attention to the aluminum-copper mixed crystals which remained after the separation. Because of the small dependency of the screen, or lattice structure constants upon the copper content this procedure was more successful.

With increasing granular separation the easily measured position of the reflex actions present from the beginning must change, and it is not necessary to depend on the proof of the appearance of newer and prospectively very weak reflexes. The details of the experiments will not be described, but, on the whole, the results showed that by an annealing at temperatures at which strong im-

provement sets in, no change could be detected in any of the screen constants. An alteration is only noticeable at annealing temperatures of about 200 deg. C., whereas the improvement sets in at volume temperature.

#### Improvement Ascribed to Complex Processes

The result was the same when mono-crystals instead of aggregates were examined. The mechanical improvement processes appeared to set in at even a lower temperature for the mono-crystals. From this it was concluded that the actual improvement process had nothing to do with

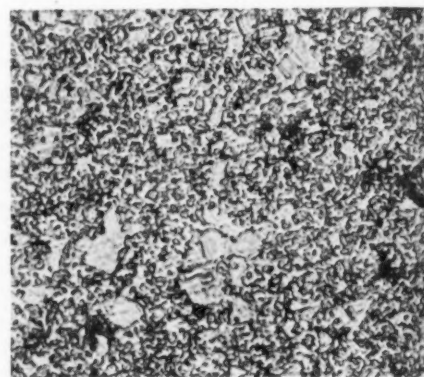


Fig. 2—Tungsten carbide containing 3 percent cobalt, sintered at 1450 deg. C. This view clearly shows the composite of tungsten carbide particles in a matrix of a cobalt-rich phase which cements the particles together.

the separation of fine small particles taking place much later, but must be ascribed to other apparently very complex processes. Fraenkel and Marx<sup>8</sup> concluded from other observations that the process takes place before the removal from the mixed crystal of the kind of molecule in question. The examination possibilities then at the disposal of experimenters were seemingly not sufficient to penetrate further into the details until Wassermann<sup>9</sup> approached the problem from an entirely new viewpoint.

Wassermann questioned whether the alloy first separating out is present in the supersaturated mixed crystal after the quenching as a compound or only in atomic solution. Investigation was also made on whether the compound formation takes place during the separation or whether it starts in the supersaturated mixed crystal. From the measurements with zinc-aluminum and magnesium-aluminum crystals, as also from the results of other investigators, Wassermann concluded that there exists greater possibility for the presence of an atomic solution than for a molecular solution. This does not mean, however, that the

separation hypothesis is disproved, but means that a further heretofore hardly recognized possibility is open for investigation.

Hengstenberg and Wassermann<sup>10</sup> corroborated the above observations by means of a further improvement of the evaluation of programs by employing an ionization chamber—used with success by Hengstenberg and Mark<sup>11</sup> on another occasion—for intensity measurements. It was shown that during crystal arrangement at volume temperature after the quenching, in place of the previously present irregular distribution of the copper in the aluminum screen corresponding to the formation of a true mixed crystal, there only appears a concentration of copper atoms in a great number of very small regions of the aluminum screen.

There is, however, no separation of copper alone or of new crystals from the structure of a copper-aluminum alloy. There sets in solely an "interior demixing," which consists in a deviation from the static uniform

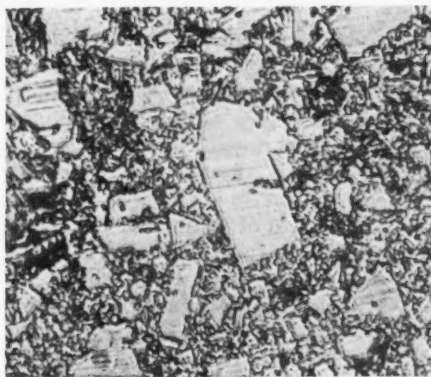


Fig. 3—Tungsten carbide containing 3 per cent cobalt, sintered at 1550 deg. C. The crystals are large, and the structure is consequently unstable, thereby causing the product to have poor physical characteristics.

distribution of the dissolved atoms in the mixed crystal screen. The nearly ideal homogeneity of the latter is thus displaced by local inhomogeneities, which Tammann,<sup>12</sup> as also Kohubo and Honda<sup>13</sup> interpreted as a collection of copper atoms on distinct verticals or planes of the lattice screen. In what manner, however, the small screen disturbances thereby produced should effect the strengthening, which is due to the nature of the improvement according to these viewpoints alone, nothing can yet be said. This is especially true since very little is known regarding the nature of the strengthening.

#### Improvement Related to Screen Disturbances

Very recently Feussner<sup>14</sup> tried to solve the question by means of a theory

which apparently placed the treatment of the improvement question upon an entirely new foundation, and brought the procedure itself into closer relationship with others already better known in metallurgy.

Feussner expressed the opinion that by means of the diffusion of the crystals in the screen of the main metal which separate out, disturbances are caused which perhaps are the same as those which appear during a mechanical treatment. This would, therefore, lead to similar improvement of strength. According to this viewpoint, the improvement would not be a blocking of the gliding surface by means of separating small particles, and it would not depend at all upon whether or not small particles had already separated out and what degree of coagulation they possessed. It would depend, however, upon the action preceding the separation, and further resulting diffusion of molecules through the screen always alters it. Also, the heretofore scarcely imagined fact that improvement lessens when aging is carried too far, does in the sense of recent observations, coincide fully with the known fact of the strengthening caused by mechanical treatment and by means of a temperature increase. It is not easy, however, to decide whether the conception described is actually correct, as the nature of the strength caused by mechanical treatment is not yet fully clear.

#### Carbides Compared with Metallic Alloys

Far more interesting is the question whether or not the pronounced properties of sintered hard metal car-

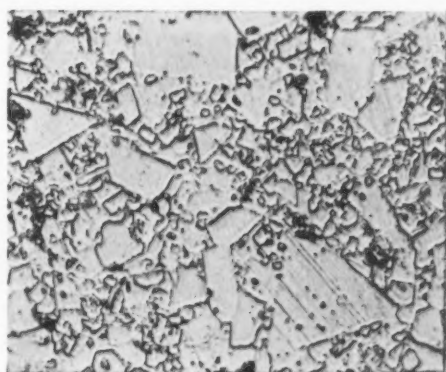


Fig. 4—Tungsten carbide containing 3 per cent cobalt, sintered at 1650 deg. C. The crystals are very large, the structure is unstable, and the physical characteristics are very poor.

bides can be explained in a manner similar to the previously described improvement phenomena with pure metallic alloys. As already indicated in the previous article, this does not

seem to be possible in view of knowledge currently available.

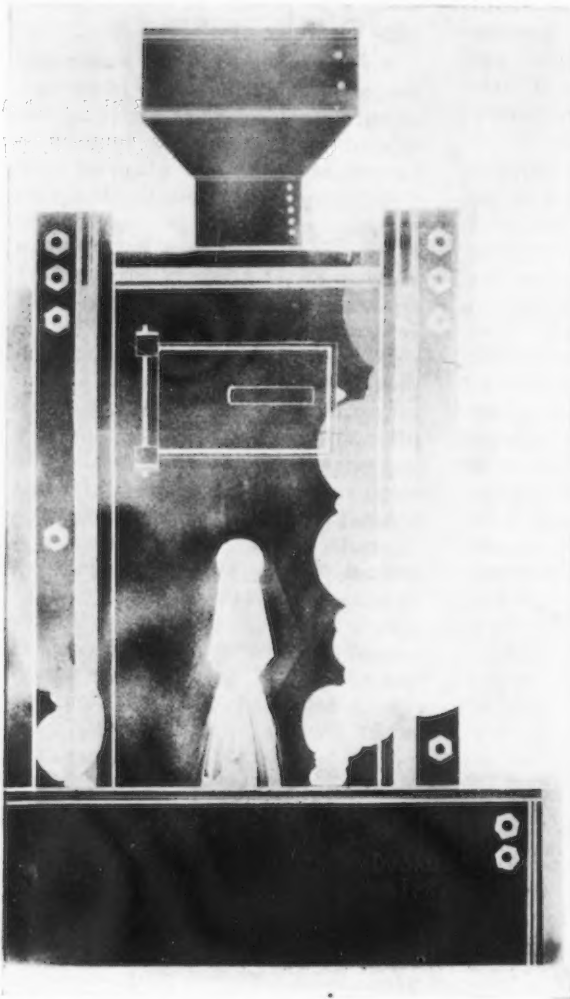
An improvement of the mechanical properties might not occur in the case of pure carbides, which are to be considered as homogeneous substances, but might occur only when an additional component is added. But pure carbides, apparently in contradiction to this conception, can be improved without an addition, if produced by sintering instead of by melting. This contradiction, however, is only an apparent one, for it is known that compact metal objects produced by sintering always contain stresses which ultimately represent disturbances in the screen when they are localized to very small screen regions. In this sense, perhaps, the greater toughness of carbide alloys as compared with poured ones is understandable from the same viewpoint as of the metallic alloys. But beyond that, a further considerable increase is obtained by the addition of lower melting auxiliary metals, and other additions, of which those of the iron group have proved most satisfactory in practice. Regarding the influence of tantalum additions, Comstock<sup>15</sup> has made valuable data available.

According to Hoyt,<sup>16</sup> the increase of the toughness, in general, follows a stronger binding of the small hard tungsten carbide particles resulting from the cobalt becoming liquid by sintering. This forms a eutectic with a part of the tungsten carbide, the melting point of which lies at about 1275 deg. C. During the sintering, if temperatures beyond 1275 deg. C. are used, bubbles are formed and the product is poor. Independent of this fact, in the case of researches of H. Wolff, it was determined that upon increasing the sintering temperatures an additional phenomenon sets in, namely an enlargement of the crystals. This shows that not only purely mechanical reasons, such as the formation of bubbles, need be the reason for the unfavorable influence of the higher sintering temperature, but that an actual alteration of the structure takes place. Therefore, the entire problem, after the increase in hardness, is extended in the same direction as the improvement of aluminum alloys. In the latter case there is also a critical aging temperature, as is to be seen from the curve shown in Fig. 1. Beyond this temperature the material cannot be heated without structural alteration setting in, and this alteration destroys the improvement previously begun. A few metallographic photographs of tungsten carbide containing 3 per cent cobalt additions are shown in illustration.

(Concluded on Page 61)



# Porcelain Enamel-on-Metal Murals



One of the murals in the Ferro Enameling Corporation's offices depicting the smelting of porcelain enamel in its experimental laboratory

**P**ORCELAIN Enamel-on-Metal murals embellished with attractive pictorial designs and intricate figures in a range of pleasing colors are a new development of the Ferro Enameling Corp., Cleveland. They offer a new medium for color and design both for interior and exterior decoration. A number of these murals have been designed and executed for the company by H. Edward Winter,

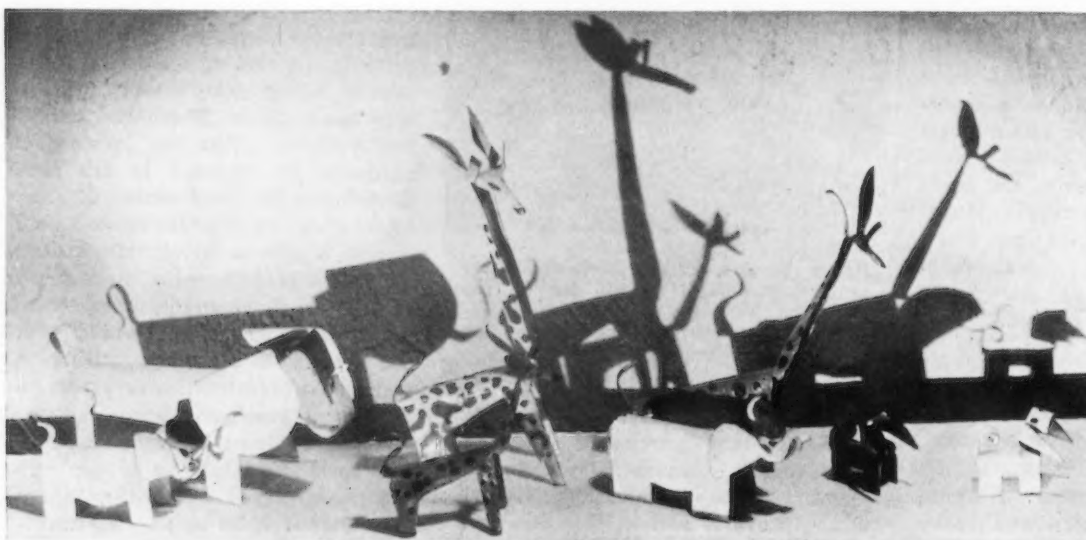
Cleveland designer and artist. These include several 3½ x 5-ft. panels depicting scenes in the Ferro factory and laboratory devoted to the manufacture of porcelain enamels, as well as general subjects designed to fit in with the decorative schemes of the various offices. These panels now adorn the walls of the Ferro company's offices.

There are four or five colors in each

of these decorative pieces, the colors used being red, blue, green, yellow, black and white. However, any color may be used. Other decorative pieces in various colorful designs have also been made in porcelain enamel.

In producing these murals there is little departure from standard enameling practice. The decorations in colored enamels are applied on No. 18 gage Armco ingot iron. First a ground coat is sprayed on the metal. This is of blackish blue enamel having a large content of cobalt that improves the sticking qualities of the enamel. Then the piece is fired and the color coats to produce the design are applied either with a spray or brush and with the use of a stencil. The firing is repeated after one or more applications of the color coats, depending on the design being reproduced.

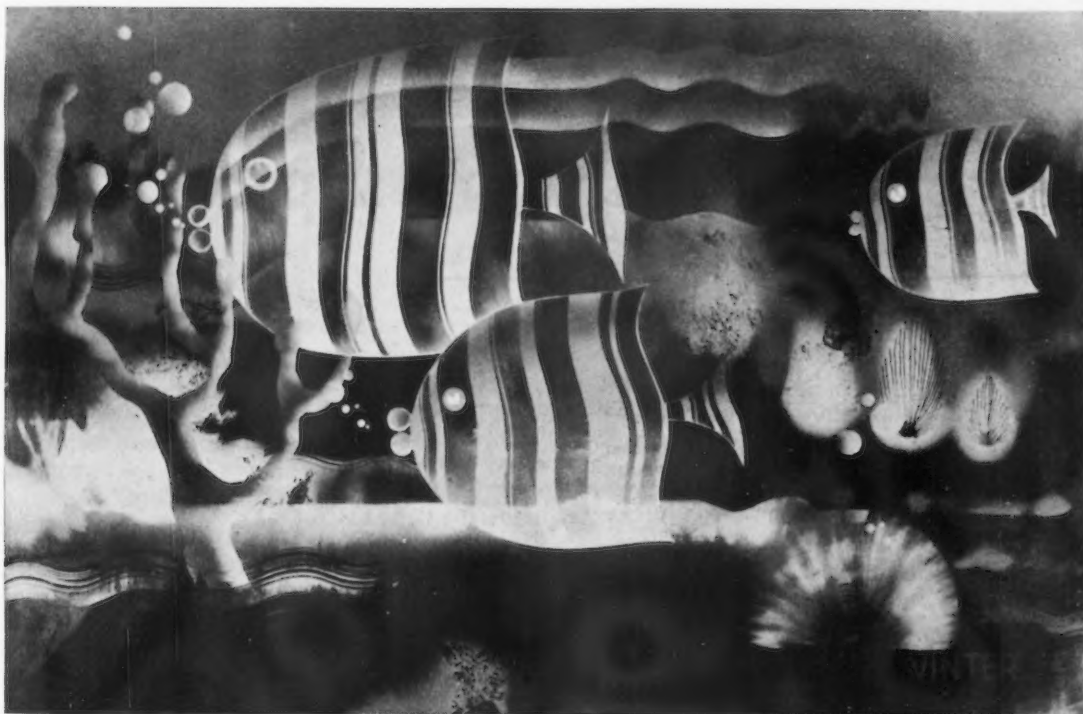
With their bright clear colorings in pleasing design and with lustrous sur-



Porcelain enamel-on-metal decorative panel.



▲ ▲ ▲  
 Porcelain enamel-on-metal decorative panel designed by H. Edward Winter  
 ▼ ▼ ▼



faces, the murals, it is pointed out, offer architects a new medium for interior decoration in lobbies, restaurants, theaters and bath rooms and for spandrels and other building exteriors. Among advantages claimed for the vitreous enamel decorations are that they are easy to install, easy

to clean, stainproof, do not fade and are rust resisting.

Another use of porcelain enamel murals for building decorations was made recently on the facade of the International Music Hall of Radio City, New York. Three mural ornaments or plaques, circular in design

and 18 ft. in diameter, were placed 60 ft. above the ground on the wall of this building to relieve an otherwise dead wall expanse. These plaques, having large figures depicting song, dance and the drama, were fabricated of various metals and the parts were porcelain-enameled before assembling.

## All-Welded Telescope Built for Wheeling, W. Va., Park

**E**XCEPT for the lens, periscope head, finding apparatus and field periscope, the telescope here pictured is entirely of welded steel construction. It was built at the suggestion of the Amateur Astronomical Society of the Wheeling, W. Va., district for installation at Ogelbay Park. At least eight employees of the Wheeling Steel Corp., including Victor Bihlman of the research laboratory, are members of the society, and through the generosity of the officials of their company, mechanically-trained members and friends of the society were permitted to fabricate this telescope at the company's Benwood plant in consultation with J. Wallace, general master mechanic.

The part that welding played in the fabrication of this instrument is described by W. F. Lautner, of the applied engineering department and district supervisor of the Air Reduction Sales Co., as follows:

First a 1½ x 22 x 32-in. slab of concrete was poured, and then a base-plate was bolted on. This plate was set in line by means of instruments, using the North Star at midnight to

assure correct reckoning. The pedestal of the telescope was then arc welded to the base plate and leveled at a 40-deg. angle as required in this



locality. The pedestal was made from an H-beam, which was gas cut and shaped at the top to house the 4-in. pipe, which, in turn, houses a shaft that is used to give the 140-deg. sweep right and left of the 10-in. pipe, 72 in. long. The shaft housed in the 4-in. pipe is balanced and mounted on Timken roller bearings at each end of the pipe. The pipe itself is arc welded to the H-beam pedestal. Another 4-in. pipe welded into the cross-section of a 12-in. channel at the right houses another shaft that allows a left and right movement of the telescope for pointing independently of the above mentioned 140-deg. sweep. This is very important for locating any particular star. This shaft is also mounted on Timken bearings at each end. The 10-in. pipe telescope proper is welded to its independent pedestal also.

This telescope is of the Newtonian type, equatorial mount, and is used by the Amateur Astronomical Society and the Nature Study Club and also by the various local high schools under the supervision of a member of the Ogelbay Park staff.

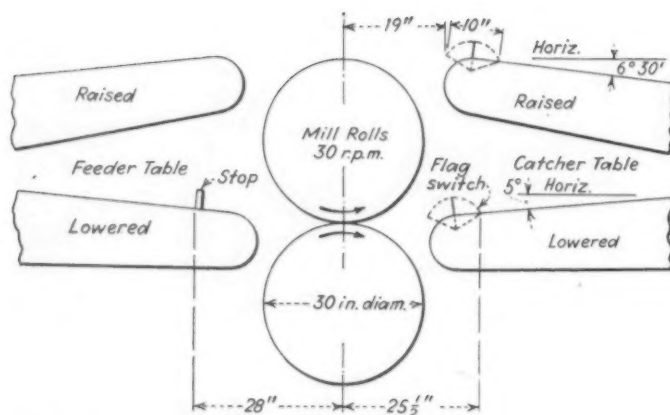


Fig. 1—The approximate dimensions of the catcher equipment are given in this schematic arrangement. ▲ ▲ ▲

# Speeds with the

By W. B. SNYDER and T. R. RHEA  
Industrial Engineering Department, General Electric Co.

It is the purpose of this article to present the results of an oscillograph time study made on an automatic sheet catcher equipment. It is also the purpose of this paper to point out a method by which the duty cycle to be expected on a similar piece of equipment might be forecast. It is frequently necessary to make such a forecast in order that the correct motor sizes may be selected to meet the duty cycle.

## The Catcher Equipment

These tests were made upon a Wean Engineering Co. catcher equipment, which consists of two tilting tables located one on each side of a two-high sheet mill. Each table has a reversing motor driving a pair of chains which carry the pack to and from the mill. Each table is raised and lowered (to feed the pack into the mill or to

receive it coming back over the top of the mill) by a non-reversing motor which tilts the table through a crank motion. The tilting motor is provided with a geared limit switch and a solenoid brake for accurate stopping at the top and bottom positions.

The "feeder table," located on the entering side of the mill, has a stop at the mill end against which the pack is held for measuring and squaring up. The "catcher table," on the delivery side of the mill, has a flag switch on the mill end of the table which controls the actual operation of the table and the forward and reverse operation of the chains.

The four motors of the table are duplicates and are of the high-resistance, high starting torque, squirrel cage, totally inclosed, fan-cooled, ball bearing type with class B insulation because of the high ambient temperatures encountered. They are built

with specially low rotor  $WR^2$  because of the quick and frequent reversals required. They are rated:  $1\frac{1}{2}$  h.p.—450 r.p.m.—440 volts—3 phase—60 cycle. The control equipment and brakes are operated from the 440-volt supply.

The mill has 30-in. diameter rolls operated at 30 r.p.m. Fig. 1 shows the approximate dimensions involved in this time study, which was made by means of an oscillograph, a sample record of which is shown in Fig. 2. The only additional control devices necessary to make the oscillograph tests were a set of contacts which were mounted on the mill so that they closed a circuit whenever the upper roll was lifted by the entering of the pack, and the direct-current tachometer generators, which were attached to the chain motors to indicate their speeds. A large number of these records were taken on all four motors

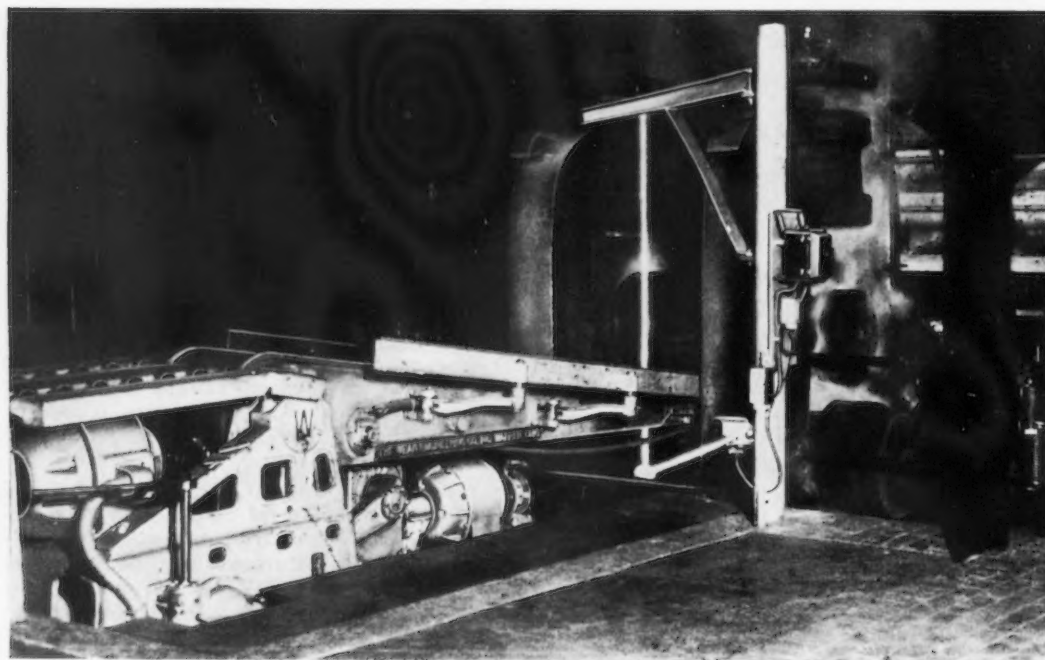


Fig. 3—The automatic sheet catcher at the works of the Allegheny Steel Co., Brackenridge, Pa., includes a photoelectric flag. ▼ ▼ ▼



# Automatic Sheet Catcher

and involving various lengths of packs in various stages of rolling.

## Operating Cycle in Detail

Table I is a tabulation of the observed operating cycle. The values shown are the average of oscillograph records of the first passes on ten different packs. The average length of these packs after the first pass was 5.45 ft., and the average mill speed was 3.94 ft. per sec.

It will be observed from Table I that while the chain motors have reached full speed in the reverse direction 0.47 sec. after the flag switch has been released, the pack does not depress the flag in the opposite direction until a further time interval of 0.49 sec. has elapsed. About 0.1 sec. of this interval can be accounted for by the fact that the pack must travel back on the table some distance beyond the point at which the flag was released before closing the flag switch contacts in the opposite direction. The remainder can only be explained by slippage between the chains and the pack.

Since the only way in which the pack can be reversed is by means of its friction with the chain, it is evident that to prevent slipping, the rate of acceleration and deceleration of the motors must be reduced. In short, these particular chain motors have more torque than is required of them to do their job well. This reduction of motor torque during acceleration can be accomplished equally well by line resistance or saturated core reactor starting control.

It will be noted that from the time the pack enters the rolls, passes completely through the roll, comes back over the top, reverses and enters the rolls again, there is an elapsed time of 6.43 sec. and in this interval the chain motor has reversed twice from full speed in one direction to full speed in the other direction. At this rate the motors are called upon to make 18.7 reversals each minute. Actually, over an all-day average the motors are not called upon to make this many reversals each minute because of time out and delays of various sorts, and because the pack length

AN insight is given in the accompanying article into the calculations that apply to the actuating apparatus for the mechanical rolling of sheets. These calculations deal in time in fractions of a second and indicate the optimum speeds and other characteristics of, say, the electric motors for operating the conveying and tilting tables of the mechanized sheet mill.

will probably average somewhat longer than 5.45 ft. The average number of reversals each minute for an all-day period probably will be more nearly in the order of 12 to 15.

It will be noted from Table I that the time required to tilt the table is

approximately one second, and that there is nothing to be gained by speeding up the tilt motion since it requires practically the same length of time to reverse the pack. In other words, in the time it takes to get the table from the bottom position to top position, the pack is reversed.

Of course, it is the application engineer's job to apply motors and control to new machines upon which no test data exist. It is, therefore, important on applications similar to this one to have a means by which the number of reversals required can be estimated in advance. From such an estimate the application engineer can determine, at least approximately, the duty cycle imposed upon the motor and by calculation determine the proper size of motor.

The four controlling factors in a

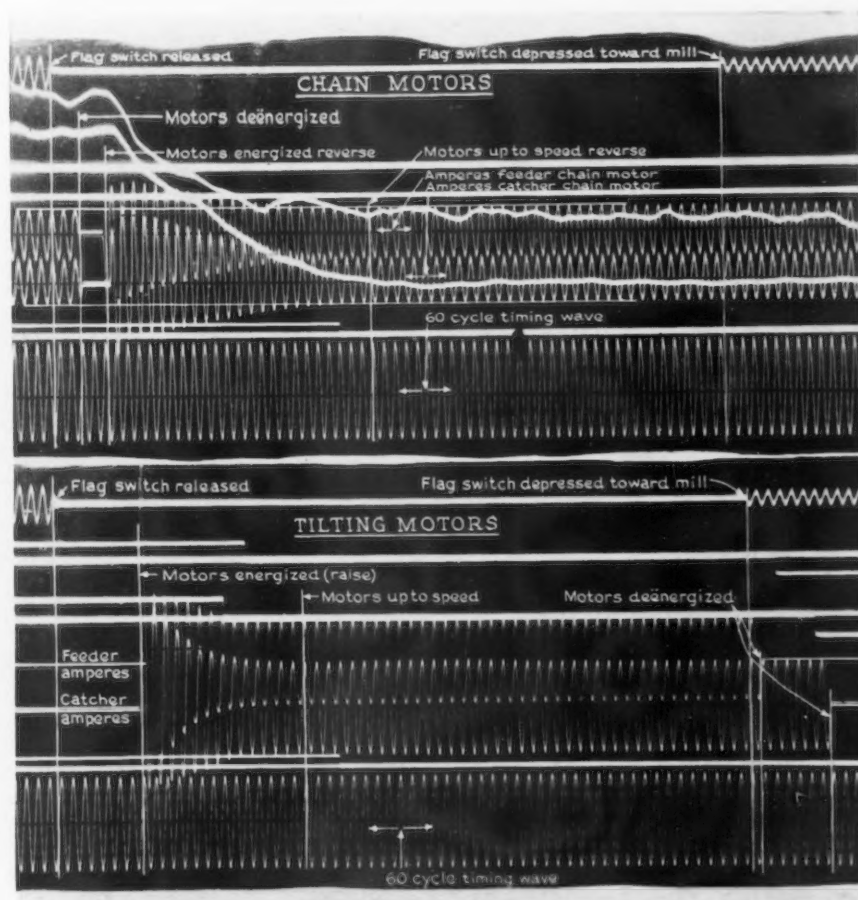


Fig. 2—A time study of the motors for the conveyor chains and the tilting mechanism was obtained by the use of an oscillograph.



time study of a piece of equipment similar to this one are:

- A. The coefficient of friction between the sheet and the chain; (i.e., the minimum time reversal possible).
- B. Delivery speed of the mill.
- C. The average length of pack.
- D. The distances which must be traveled.

The maximum coefficient of friction between the chain and the pack probably cannot be over 0.4 for static friction, and it is probable that in practice the coefficient does not exceed 0.3, due to vibration and unevenness of the chain.

Assuming the tables are horizontal when reversal takes place, the minimum time of reversal can be found from:

$$a = \text{coefficient of friction} \times 32.2 = \text{maximum accelerating rate ft./sec.}^2$$

$$t = \frac{v}{a} \text{—where } v \text{ is velocity in ft./sec. This } a \text{ gives the time in seconds to accelerate from rest to } v.$$

$$t^2 = \frac{2S}{a} \text{—where } S \text{ is the minimum distance in feet in which the pack can be accelerated or decelerated.}$$

With the delivery speed of 236 f.p.m., or 3.94 ft. per sec., and a coefficient of friction assumed to be 0.3 the values are:

$$t = 0.407 \text{ sec. to accelerate or decelerate.}$$

$$s = 0.804 \text{ ft. minimum accelerating and decelerating distance.}$$

The minimum time to reverse will be twice the above value, or 0.814 sec.

TABLE I—OBSERVED TIME CYCLE  
Average of 10 Oscillograms for First Pass

Operation	Time (Sec.)	Time Interval
Pack enters rolls.....	0	
Flag switch depressed forward .....	0.44	0.44
Pack leaves rolls.....	1.38	0.94
Flag switch released....	1.85	0.47
Chain motors deenergized .....	1.89	0.04
Chain motors energized reverse .....	1.93	0.04
Tilting motors energized (raise) .....	1.97	0.04
Tilting motors up to speed .....	2.21	0.24
Chain motors up to speed reversed .....	2.32	0.11
Flag switch depressed reverse .....	2.81	0.49
Tilting motors deenergized (tables at top).....	2.91	0.10
Flag switch released....	4.05	1.14
Catcher tilt motor energized (lower).....	4.09	0.04
Feeder tilt motor energized (lower).....	4.38	0.29
Catcher tilt up to speed..	4.42	0.04
Feeder tilt up to speed..	4.64	0.22
Catcher tilt deenergized..	4.96	0.32
Feeder tilt deenergized...	5.21	0.25
Chain motors deenergized .....	5.25	0.04
Chain motors energized forward .....	5.29	0.04
Chain motors up to speed..	5.67	0.38
Pack enters rolls.....	6.43	0.76
9.33 passes, or 18.7 reversals, per min.		

Note that it has been assumed that the table is horizontal. Actually the table tilts as shown in Fig. 1. This makes some difference in the effective coefficient of friction, but the time gained in reversing while the pack is traveling uphill is lost when the pack is traveling downhill, and a horizontal condition is assumed as an approximation.

The essential dimensions assumed are taken from Fig. 1. The average length of pack may be anything, but is assumed to be 5.45 ft. since this corresponds to the oscillograph tests made on the actual mill and as tabulated in Table I. Table II indicates the time involved for two complete reversals. It is assumed that the piece is on the catcher table, and is just entering the rolls at full mill speed.

In making the above tabulation, it is assumed that the chain motors will reverse themselves and the chains in 0.81 sec., or less, since this is the minimum amount of time in which it is possible for the friction between the chain and the pack to reverse the pack. The application engineer must choose a motor with a speed torque characteristic which will reverse the chain in this amount of time or less. Such a calculation is readily made and involves the motor  $WR^2$ , the friction load and the  $WR^2$  of the chains themselves.

As shown in Table I, the motors actually applied reverse the chains in less than half this time which therefore indicates that they have more torque than is actually required. More torque from the motor will not increase the number of reversals or passes per minute as long as the above conditions are met. More torque would only cause the packs to slip more, and would not decrease the reversing time. Likewise, very little, if any, time would be gained by increasing the speed of tilt over that obtained in the present application and shown in Table II, since the catcher table tilt is simultaneous with reversals, and the reversal requires about the same time as the tilt. The time of tilt, using a given motor, can be calculated in any given case providing the application engineer knows the mechanical details of the tilt motion together with the weight, lever arm, and spring balance, etc., although the process is somewhat laborious.

Since the speed of operation, and therefore the tonnage produced, cannot be increased by increasing the present motor torque, it is interesting to ask what are the limiting features? Obviously, they are the delivery speed of the mill and the distances to be

TABLE II—CALCULATED TIME CYCLE  
Delivery speed 236 f.p.m. (3.94 f.p.s.);  
length of pack, 5.45 ft.

Position of Pack	Calculated Time Seconds
Pack enters rolls.....	0
Pack leaves rolls.....	1.38
End of pack releases flag (25 1/2 in.) .....	0.54
Time required to reverse.....	0.81
Elevation of table assumed as simultaneous .....	
Back end of pack releases flag .....	1.38
Back end of pack reaches feed table stop (53 1/2 in.).....	1.13
Time required reverse.....	0.81
Lowering of table assumed as simultaneous .....	
Time required to reach rolls (28 in.).....	0.59
Total time.....	6.64
Reversals per minute.....	18.2

traveled. If the speed of the mill should be raised to 400 ft. per min., the time of reversal would increase in direct ratio and the time required to travel the fixed distances shown in Fig. 1 would go down inversely. Much of the time gained in traversing the fixed distances at higher speed would be offset by the increased time required to reverse the pack and calculations indicate that about 19 reversals each minute for this length of pack could be obtained.

By laying out such a time cycle on a completely new job, even though approximate, the proper electrical equipment can be selected.

## New 23-11 Clad Steel Useful in Paper Mills

A NEW clad alloy known as Ingo Oclad 23-11 has been placed on the market by Ingersoll Steel & Disc Co., a division of the Borg-Warner Corp., Chicago. The new product is a two-ply rustless steel having a 20 per cent rustless layer of 23 per cent chromium and 11 per cent nickel bonded to a back of mild carbon steel. It is said to offer better resistance to the forms of damaging corrosion attack encountered in both sulphite and sulphate pulp and paper mill applications than the regular 18-8 series of alloys. The new material is produced under the well-known Ingersoll ingot patented process and the fabricating procedure is similar to that used in manufacturing 18-8 Ingo Oclad. The material can be welded with a 25-12 chrome-nickel electrode, and may be secured in sheet or plate form in all commercial sizes.

# Jobbing Shop for Heat Treating

By J. B. NEALEY  
American Gas Association

THE heat treating of steels and alloys is one of the most profound of modern sciences. Elaborate and involved theories have been developed by scientists on the one hand while on the other practical heat treaters are striving constantly to translate these theories into practical formulas. Furthermore, the ingenuity of the men on the "firing line" is taxed to the utmost to design furnaces and combustion equipment that is sufficiently adequate to cover all of the jobs that are being continually submitted to them. Nowhere is this more evident than in the commercial heat treating jobbing shop where a steady stream of work pours through at all times and practically every order requires individual study and treatment and a different furnace set-up.

The plant of the Lindberg Steel Treating Co., Chicago, exemplifies all this to a degree and a number of unique furnace designs and special heat treatments have been developed here. This is one of the largest commercial heat treating job shops in the country and its list of customers includes firms all over the United States and Canada. Started more than 35 years ago, the company has been forced to move into larger quarters three times within the past few years. Its present plant is housed in a modern two-story brick building and a fleet of delivery trucks is employed in picking up and delivering work throughout the city and surrounding country.

The volume and variety of work handled by this company is so great that more than 40 furnaces are required adequately to take care of it. Practically all of these are fired with gas fuel. The main heat treating division is a huge room down the length of which run five lines of furnaces, with quenching tanks, straighteners, etc. Two overhead traveling cranes with hoists serve the entire room. The cyanide division is in a separate room

which also contains a unique drawing or low temperature furnace, a broach hardening furnace, and the quenches and cleaning equipment. The high-speed tool-steel hardening division together with the chemical and physical laboratories, are located on the second floor.

That batch type furnaces are best adapted to handle the bulk of the work

**WHAT** equipment a shop requires for heat treating steel parts of a wide variety of shape, size and composition is exemplified in the case of the Lindberg plant in Chicago here described. There are box type furnaces for batch lots and shaker-type hearth furnace for mass hardening of small parts, including mechanical removal of the work from the quenching tanks. Carburizing is done in the batch furnaces, using packing boxes, or in rotary retorts with either solid carburizing material or carburizing gas. Included also is a rotary furnace which receives through a needle valve a liquid which by the heat is converted into a carburizing gas. Drawing is done in a rotary furnace with special control of the temperature of the air supply for the drawing, and there are facilities for nitriding.

In a job shop is evidenced by the fact that these predominate. They are arranged in two rows down the center of the main room. They range in size from 3 x 7 ft. to 6½ x 9 ft. and are built of firebrick encased in steel plates and set on legs for the convenience of the operators. Below the single door of each is a steel charging apron which is used as an aid in charging and withdrawing the work.

Of the semi-muffle type each furnace is underfired with two gas burners on each side (four burners to a furnace). Directly in front are a number of steel quench tanks conveniently placed.

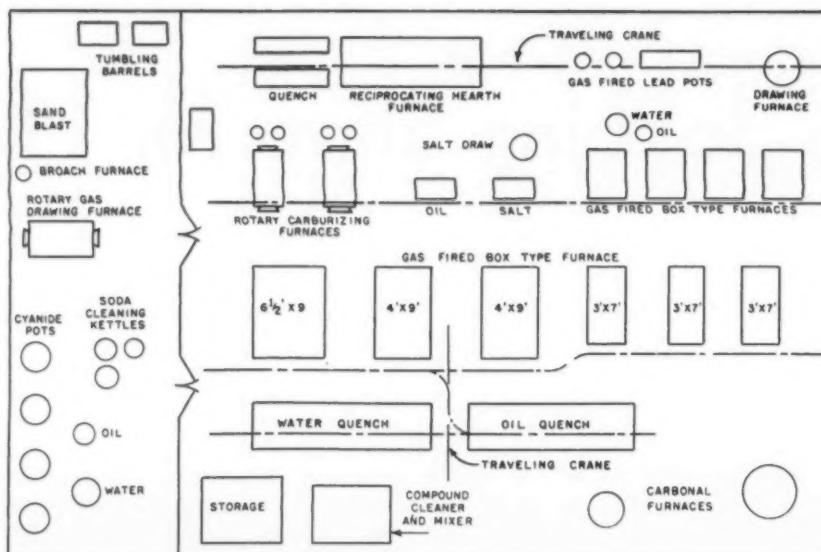
Mass hardening of small parts is accomplished in a reciprocating or shaker-hearth type furnace, which is 8 ft. long, 3 ft. wide, 2 ft. high and stands on 4-ft. legs. The alloy hearth is 18 in. wide with 2 in. side walls and it is given the reciprocating motion by means of a motor driven cam and link mechanism. The motion is a slow forward movement and quick return which causes the work to progress along the hearth and through the furnace. This is heated with ten gas burners on each side (20 in all) underfiring the hearth, and the temperature is automatically maintained with the aid of a controller. The heated work drops off the discharge end of the hearth directly into either of two long steel quench tanks, one with water and the other with oil. Each is provided with an inclined perforated steel cylinder or screen, rotated by motor. Screw baffles on the inside cause the work to travel through the quenching medium and up out of the tank to be discharged into containers for further handling.

Two methods of carburizing are employed here, the first consisting of packing in boxes and heating in batch type furnaces, while in the second, rotary retort furnaces are used either with carburizing material or gas flowing through the retort to supply carbon to the work being treated. There are two rotary furnaces of the tilting type consisting of a refractory lined steel shell containing a motor driven alloy steel retort. Gas burners, protruding through the shell, two rows on each side, fire against the rotating retort thus supplying the heat and the temperature is regulated by automatic controllers. In front of each of these furnaces are two cylindrical quench tanks, for oil and water re-

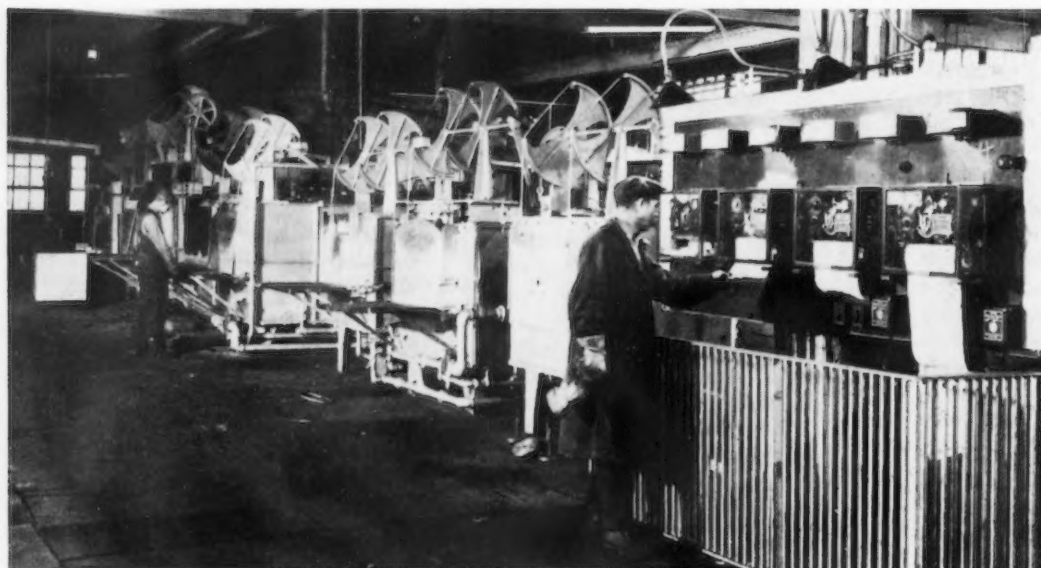


spectively, which are sunk in the floor.

There is a third rotary furnace, like the two described, which is used for drawing. As heat transfer in low temperature operations is through convection, the rotary furnace was equipped to provide a maximum amount of heat circulation. First a perforated steel cylinder was riveted inside the retort of such size as to allow a  $1\frac{1}{2}$  in. space between the two all around. In addition to the regular gas burners firing against the retort, air is blown into the retort through a U pipe. The first leg of this pipe is fixed to the center of the cover at one end and runs through the retort where it bends and returns on itself, the other leg being located between the retort wall and the screen cylinder. The air is thus preheated in the first leg and then brought up to



Five lines of furnaces occupy the main part of the plant of the Lindberg Steel Treating Co.,



#### AT LEFT

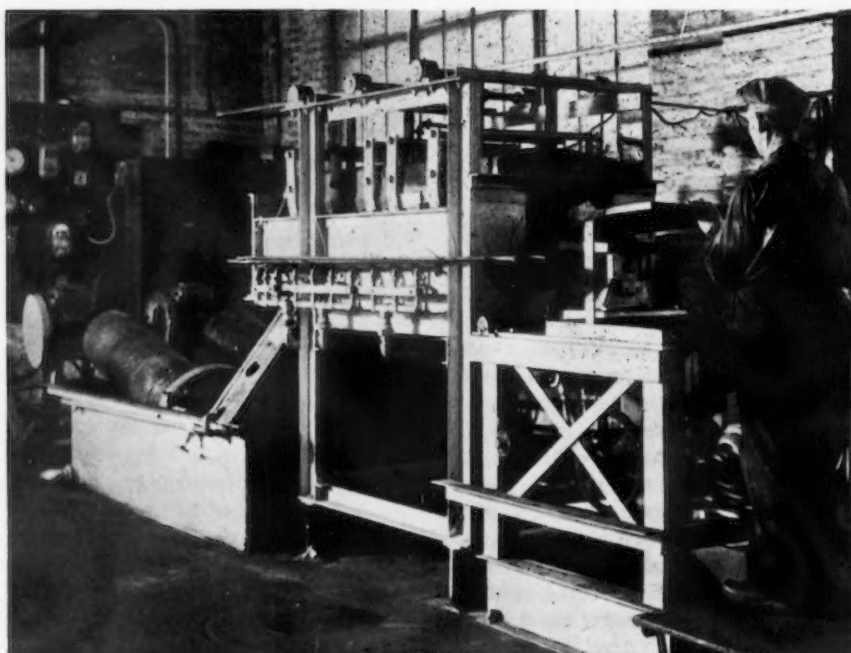
At one end of the row of the larger furnaces is the temperature control board, with both indicating and recording pyrometers.

#### BELOW

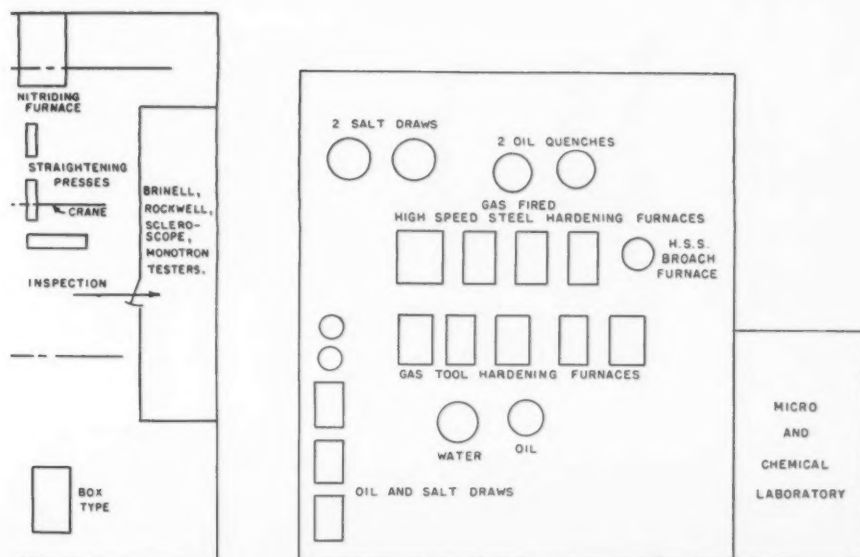
Small parts for hardening are fed upon a reciprocating hearth which carries them to the rear where they are dumped into the quenching tanks and then recovered mechanically by the revolving perforated cylindrical screens which deliver to containers for further handling.

temperature in the other, by means of a separate row of gas burners. The perforated cylinder has four angle irons running from front to rear which causes greater movement of the work during rotation, which, combined with maximum heat distribution makes this one of the most effective, low temperature furnaces available anywhere. An automatic temperature control is also part of the equipment of this unit.

Carburizing followed by heating to a high temperature and quenching is usually accompanied by some degree of distortion and deformation. On the other hand nitriding is accomplished at temperatures low enough to escape distortion and is preceded by the heat treatment for grain structure refinement. For this reason there are some applications where "nitralloy" steels and nitriding are far superior to carburizing. With this in







Chicago. Tool steel treating and laboratories are on the second floor.

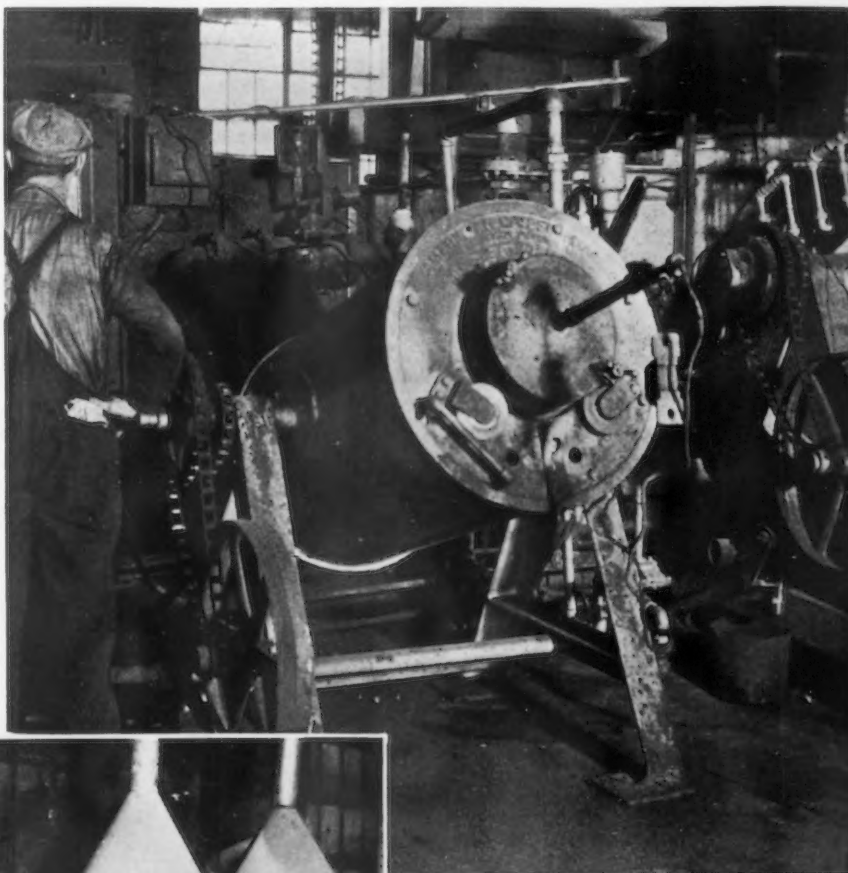
mind there was included in the plant equipment, two nitriding furnaces, one of the box type and the other of the circular pit type. These two units are capable of handling practically every requirement in the field of nitriding. Gas tight metal boxes with ammonia inlets and outlets are included and the work is loosely placed in these in layers. These layers are separated one from the other by nickel wire netting so as to promote heat and gas circulation. A tinning bath is used to cover parts, such as threads, where selective nitriding or carburizing is required.

A furnace, unique both in design and operation, is employed for carburizing. It is of the cylindrical pit type and contains a gas tight retort in which the work is packed. When the furnace and retort have been heated to the proper temperature a special liquid is dripped into the latter by means of droppers with needle

valve controls, which are located on the cover. This liquid breaks down, with the heat, into a gas which carburizes the work.

Among the quenching tanks on this floor is one for oil of 10,000 gal. capacity and another for water of 5000 gal. capacity. There are also eight hand straightening presses, a mechanical press and an 100-ton hydraulic press.

In the department adjoining is a row of cyanide furnaces, the rotary furnace used for drawing and already described, a cylindrical broach furnace and cleaning equipment, including tumbling barrels, sand blaster, etc. The inspection department is at the other end of the plant and this is equipped with Monotron, Brinell, Rockwell and Scleroscope hardness testers, etc. The broach or reamer



A rotary furnace (above) for drawing has a perforated steel cylinder within retort and receives air blown through a U-shaped pipe.

The cyanide furnaces (at left) are gas-fired.



furnace is cylindrical in shape and is built in sections that can be placed, one on top of the other, to give it any height required by the work. Each section is 2 ft. in diameter and 14 in. long and is provided with two gas burners. The heat is regulated by an automatic temperature control with a

(Concluded on Page 68)

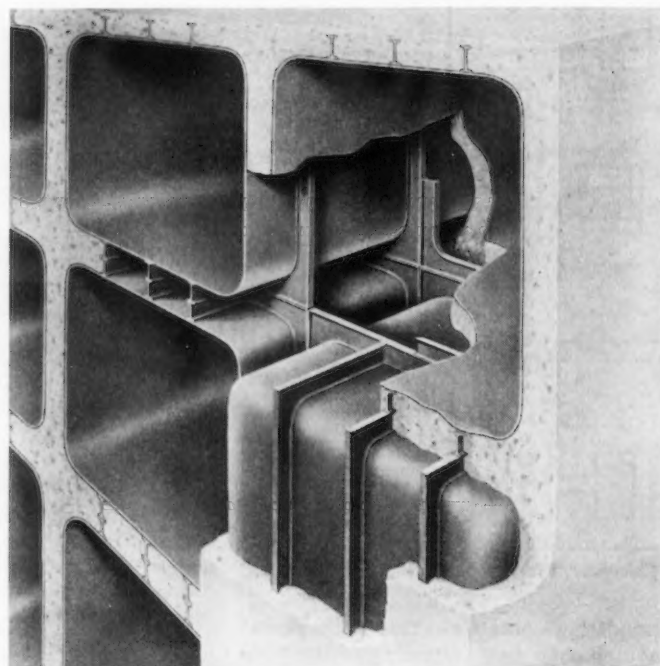
## Steel and Concrete Used In Beer Storage Tanks

**T**ANKS composed of plain or alloy steel units inclosed in concrete are being built by the White Construction Co., Inc., 95 Madison Avenue, New York, for the brewing and other industries. These tanks may be used in individual units or stacked in layers and tiers to form a large or small battery.

As shown in the illustration, each tank unit consists of a rectangular steel plate cell and a continuous I-beam frame, which is welded to the top and bottom of the individual cell. The cell itself may be of ordinary steel or of a corrosion-resisting metal such as stainless steel, and in the form of solid or clad plates. For storage of beer, ordinary steel plate coated with mastic or enamel is frequently employed.

In building up a battery, the individual units are placed alongside or on top of each other, the I-beams making contact as shown. A layer of concrete is then poured in each duct

Individual tank units may be of ordinary steel or of corrosion-resisting metal, either solid or clad. The I-beam framework, attached to the tank by welding, serves as a stiffener.



and allowed to flow down and under the tank unit until all the spaces have been filled. Another tier of units is then placed on top of the lower one, registering the I-beams over each other, and the layer thus formed is then filled with concrete. The top of the last tier of tanks is covered with concrete to form a surface that may be utilized either as a floor or a roof. The tank units are brought to the site ready to be set up and embedded in the concrete.

This construction, which is patented,

is emphasized as providing a structure of maximum strength and rigidity, capable of sustaining high pressures although using light-gage steel members. Compactness is also a feature, the rectangular construction giving a maximum of storage capacity within a given space. Thermal control can be provided for each tank unit by means of individual internal coils. Finally, smooth interior surfaces and large radii at the corners facilitate cleaning and inspection of each tank unit.

## Improved Shore Durometer and Elastometer

**T**HE Shore Instrument & Mfg. Co., Jamaica, N. Y., has brought out an improved Durometer and Elastometer, which, with the operating stand shown, are used for measuring the hardness and elasticity of rubber and composition products, either during development or in processing.

The abutment through which the impresser pin operates is now of a size and balance that makes for better constancy under variations of surface conditions and applicational pressure. An adjustable shield has been provided to protect the sensitive impresser pin and the interior mechanism from injury when the instruments are not in use, particularly when they have been removed from the operating stand. Refinements that facilitate calibration through internal adjustment have also been incorporated. Absence of sliding parts in these instruments not only minimizes friction but permits successful use where chemicals and grit are encountered, as in rubber works.



In determining the proper cure of rubber, hardness is the property measured, and when a high degree of the rubber's natural elasticity is to be retained, the hardness may be measured by the type A Durometer. The hardness indicated is convertible to pressure per unit area, in which terms the rigidity is commonly estimated.

The Elastometer is used for determining the surface elasticity of the pliable rubbers, which elasticity is convertible into an approximate percentage of elastic stretch. The test may be made on a finished surface without injury to the material. Elasticity in terms of this instrument is said to be included in specifications when the rubber is to be subjected to high-duty service and when its efficiency as to resistance to wear or injury under the required stress frequency and load sustaining power depends upon a stipulated quantitative value. This value is obtained by multiplying the hardness degrees by those of the elasticity.



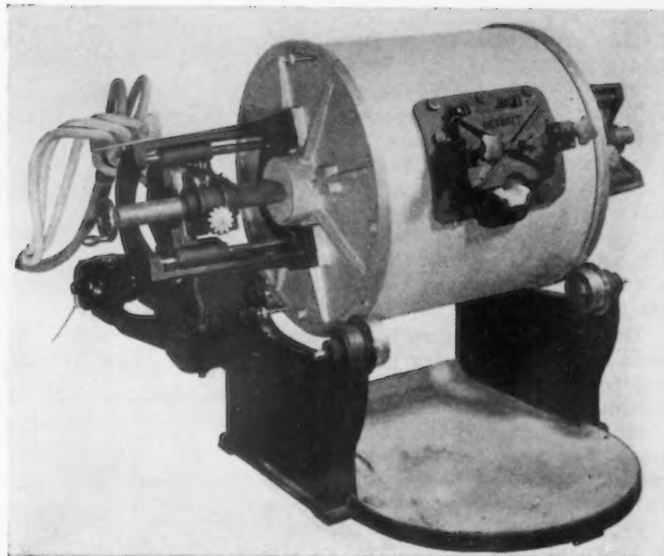
## Rocking Electric Furnace Of 100-lb. Capacity

A NEW rocking electric furnace, of 25 to 100-lb. capacity, has been announced by the Detroit Electric Furnace Co., Detroit. The unit has been designed for either production or experimental melting of small lot runs of metals, such as iron, alloy steel, copper, brass, nickel, aluminum or precious metals.

Except for size, the furnace is a reproduction of the larger rocking electric furnaces and, according to the manufacturer, will provide the speed, economy, and analysis control obtained with these furnaces.

"The keen interest of college engineering shops and laboratories in recent metallurgical developments has prompted the production of this small furnace as a part of our standard line. The requirements for speed in melting and shorter cycle heat treatment have given electric furnace metal an enormous advance, especially in the ferrous field," says E. L. Crosby, president. "Since we built the first of these furnaces, we have

Rocking electric furnace for charges of 25 to 100 lb.



been told by many production and jobbing foundry superintendents and metallurgists that they wanted one of these units as a pilot implement to direct large production runs, as well as for quick special heats of 50 to 100 lb."

The furnace is equipped with transformer, control panel, switches, meters and rocking mechanism. It has a nominal electrical rating of 20 kw. and may be connected to any industrial power supply.

## Grinder Designed to Use High-Speed Wheels

THE grinding machine here pictured, a new product of the Hammond Machinery Builders, Inc., Kalamazoo, Mich., has been designed to use high-speed wheels, driven either by one or by two motors.

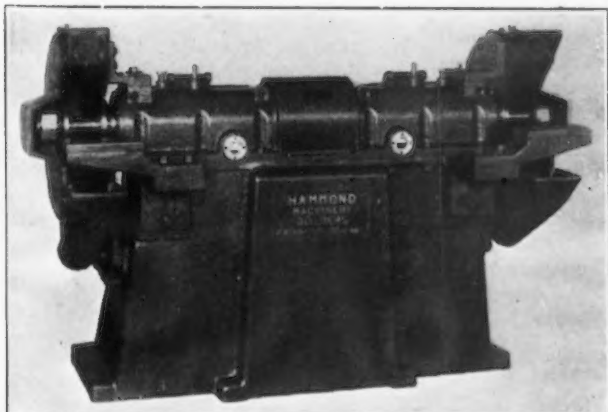
The machine has two independent spindles. In the single-motor drive

arrangement the two inner ends of the spindles are connected by a combination coupling and V-belt pulley, making it possible to remove the V-belts, by disconnecting the coupling, without removing the spindle from the bearing housings. Motors up to 15 hp. may be used. With the two-motor drive arrangement, each spindle is driven independently, and either can be operated at different speeds from the other. Motors up to 7½ hp. may be used for each spindle.

Either one or two motors may be used to drive the high-speed grinder shown below.

\* \* \*

The Quickwork stamping trimming machine equipped for gagging the cut from the top of the work is pictured at the right.



Spindles are of alloy steel, turned and ground, and are mounted in large ball or roller bearings. They are provided with either a plain or a cascade oiling system. In the latter a pump driven from the spindle by means of worm gearing delivers a continuous stream of filtered oil over all bearings. Sight feed indicators show the oil level in the pump and the delivery of oil from the filter to each bearing.

Special attention is said to have been given to the work rests, which are equipped with removable plates. Boiler-plate steel wheel guards that meet all safety codes are provided. Motors are of standard type and mounted on the rear of the base. Locks are provided to prevent spindles from turning when changing wheels.

## Machine For Trimming Variety of Stampings

FOR trimming refrigerator and bread pan tops, certain automobile and other stampings in one plane, the





Quickwork Co., St. Marys, Ohio, is offering the new machine here illustrated.

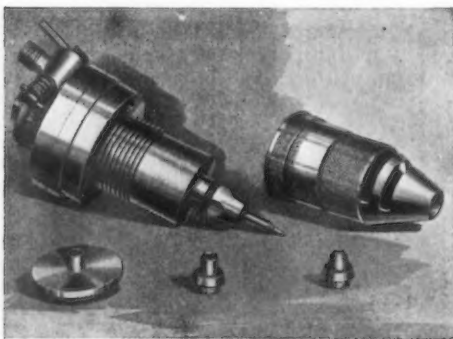
The cutters revolve continuously, and the one cutter is moved to and from the other by means of the large lever at the operating position. The table top, made large enough to accommodate the largest stamping, serves as a gage. Where it is desired to gage the cut from the top of the stamping, a form such as shown in the illustration is provided.

The machine is driven by a geared-head motor. All major parts are of welded steel-plate construction. The cutting speed provided in each machine is governed by the nature of the work. For large stampings with small radii at the corners, two speeds are provided. These speeds may be changed instantly, and the high speed is approximately three times the low speed.

### Air Turbine Motor and Hand Router

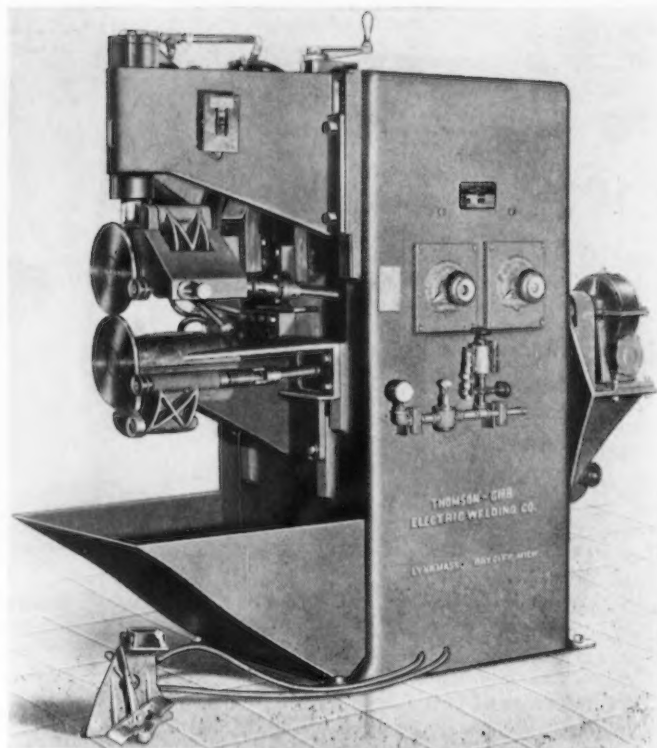
**A** COMPRESSED air turbine motor that develops a speed of 50,000 r.p.m. and approximately ¼-hp. and weighs only 2 lb. 2 oz., is being manufactured by the Onsrud Machine Works, Inc., 3900 Palmer Street, Chicago. It may be operated in any position and is adaptable for use as a hand tool or for mounting on machines. A standard hand router fixture, shown at the right in the illustration, has been designed for use with this motor.

The motor is of impulse turbine type, having one reaction stage. The turbine rotor is milled out of aluminum bronze having a tensile strength of 50,000 lb. per sq. in. It is precision made throughout and incorporates



This air turbine motor is adaptable for use as a hand tool or for mounting on a machine. The hand router fixture designed for it is shown at the right.

selected ball bearings with fabric and bakelite retainers. Lubrication is automatic. The oil is contained in the chambered spindle and is thrown by centrifugal force through resistance plugs directly into the ball bearings, a constant oil film being maintained on the vital parts of the bearings without waste or surplus. One filling of oil serves for at least 24 hr. of operation.



### New Series of Production Seam Welders Has Wide Range

**F**OR mass production straight or circular seam welding of ferrous metals, corrosion-resistant steels and, with slight modifications, non-ferrous metals, the Thomson-Gibb Electric Welding Co., Lynn, Mass., is offering the new seam welder illustrated, which is designated as the "1000 Series."

In materials and workmanship, the machine is said to be comparable to modern machine tools. Knurl or friction drives provide constant welding speed regardless of welding wheel wear. Means are also provided for maintaining constant welding pressure. A highly efficient cooling sys-

tem is another feature of the new design. Careful attention has been paid to selection of the proper interrupting or current varying device to suit a variety of given production conditions.

This 1000 series seam welder has a considerable range of application, handling objects from 10½ in. in diameter and 12 in. in length to 40 in. in diameter and 45 in. in length at welding speeds ranging from 2 to 15 ft. per min. and welding pressures from 650 to 1400 lb. A 100, 150, 200, or 250-kva. transformer is furnished depending on the work.

### Carboy Hand Truck Has Pneumatic Tires

**F**OR handling carboys, the Lewis-Shepard Co., Watertown, Mass., has brought out a hand truck equipped with new small size pneumatic tires which make for easy running over all floor conditions. In operation, the carrying arms are spread apart by depressing the foot lever, located just over the axle. The truck is run astride the carboy with the arms underneath the side cleats. By depressing the lower foot lever the arms are drawn in securely against the carboy sides by coil springs and the operator, by bearing down on the truck handles, raises the carboy to carrying position.





## THE NEWS OF THIS WEEK

### Common Pleas Judge Calls Closed Shop Illegal

**C**OMMON PLEAS JUDGE McMAHON of Cleveland has handed down an interesting decision in the suit of Drake Bakeries, Inc., to restrain the Cleveland Bakery Drivers' Local No. 52 from continuing its strike activities.

A permanent injunction was issued against the union compelling it to discontinue all strike activities by the judge, who ruled that a labor union cannot force a closed shop on a firm where all of the workers in a craft are not members of a union.

"The position of the defendant, D. G. Bowles, business agent for the Bakery Drivers' Local No. 52, is that under NRA, if a majority of drivers of a company choose the union to

represent them, the minority of employees would, under the act, be compelled to surrender their representation to the union or quit their employment," the decision reads.

"There is nothing in section 7A which permits such a contention," the decision continues. "By the expressed language of that section the representation must be of the employee's own choosing. There is no mention of the majority controlling the minority."

Judge McMahon ruled that the union tried to force the Drake Co. to violate its contract under the NRA code and that a combination for such a purpose is a combination to do something which is wrong.

### American Smelting Co. Gets F.T.C. Complaint

**T**HE Federal Trade Commission has issued a complaint charging the American Smelting & Refining Co., of New York, with violation of Section 7 of the Clayton Act in acquiring the capital stock of Federated Metals Corp., New York, a New Jersey corporation alleged to be a competing concern.

This acquisition resulted from a reorganization agreement of Sept. 30, 1932, between the two companies in which a new company bearing the name of Federated Metals Corporation, of Delaware, was formed, the Commission charged. American Smelting & Refining Co. acquired all capital stock of the new company by exchanging therefor its own \$3,500,000 par value first mortgage thirty-year gold bonds and approximately \$2,129,555 worth of warehouse certificates representing copper, lead and spelter (zinc) in marketable form, according to the complaint.

The original Federated Metals Cor-

poration then transferred to the new company all its business, assets and good will, the Commission explains. As a result of the two exchanges, the new company is said to be controlled by American Smelting.

Acquisition by American Smelting & Refining Co. of the new company's capital stock, or share capital, is alleged by the Commission to cause a substantial lessening of competition in interstate and foreign commerce between American Smelting & Refining Co. and the Federated Metal Corporation, of Delaware, and its predecessor, Federated Metals Corporation, of New Jersey, in the sale and distribution of non-ferrous metals, by-products and mixed metals, including copper, lead spelter, zinc dust, lead and tin pipe, and tends to create a monopoly in American Smelting & Refining Co.

The original Federated Metals Corporation, of New Jersey, owned the Great Western Smelting & Refining Co., Chicago; Duquesne Reduction Co., Pittsburgh; Union Smelting & Refining Co.; Trenton Smelting & Refining Co., and Eagle Smelting &

Refining Works at the time of the acquisition.

American Smelting & Refining Co. owns smelters and refining plants in Baltimore, Denver, Omaha, San Francisco, El Paso, Maurer, N. J., Alton, Ill., Reading, Pa., East Helena, Mont., Garfield, Utah, Sand Spring, Okla., Hayden, Ariz., Leadville, Colo., Durango, Colo., Murray, Utah, Amarillo, Texas and Tacoma, Wash. The company also has producing interests in Mexico, Peru, Newfoundland, British Columbia.

### Conference Board Reports Better Business

**B**USINESS conditions showed continued improvement in January, and gains in production and basic distribution were extended into the first half of February, according to the current monthly report of the Conference of Statisticians in Industry of the National Industrial Conference Board. Advances in production in some major industries were greater than seasonally normal at this time of the year, and declines in others were less than expected. Primary distribution of commodities showed a measurable gain of more than seasonal proportions, while retail trade declined in January under the December level by an amount normal for the two months.

Industrial production as a whole continued to advance in January and in February to date. Automobile output was stepped up sharply. Steel and iron production also continued their December gains. Bituminous coal output showed more than seasonal improvement. Electric power production declined slightly in January, but turned upward in the first half of February. Building and engineering construction declined measurably in January as compared with December, but the decline was not so much as is normally seasonal for the two months, and the value of awards was more than double the total of a year ago.



# British Steel Operations Now Best in Several Years

LONDON, ENGLAND, Feb. 20 (By Cable).—Demand for British pig iron has quieted, following its recent price advance. Adequate supply has been assured by the relighting of additional furnaces, but the demand for Cleveland foundry grades is well maintained. Recent advances did not affect the price of basic iron.

Steel works are operating at their highest production level in several years. Semi-finished products are heavily sold. There have been a number of new orders placed with shipbuilders which will stimulate steel demand. Among these are two liners and two cargo vessels for the Union Castle line. Increased orders are also expected from the home railways, due to their improved financial position.

Welsh rerollers have bought 5000 tons of Canadian billets. Tin plate demand is steady, with home deliveries against existing contracts proceeding at a high rate. New orders are less plentiful.

The Continental iron and steel market is improving and there is a better demand from the United Kingdom in

this market owing to higher English prices.

The rumor of an export agreement between the Continental Cartel and British steel makers has been officially denied. International Tube Cartel has reached an understanding with Swedish works regarding the form of agreement and a contract can now be signed. Continental rail exporters have requested the International Rail Makers' Association to reduce prices owing to Polish price competition on small contracts. English works are competing successfully in the Dutch market following the recent advance in Dutch prices.

## Y. S. & T. Co. To Install Steckel Hot Strip Mill

THE Youngstown Sheet & Tube Co. has ordered equipment for the installation of a Steckel hot strip mill, for installation at its Indiana Harbor, Ind., works. The company has also concluded a licensing agreement with the Cold Metal Process Co., Youngstown, covering the operation of mills of this type. The installation at Indiana Harbor will be capable of rolling hot strip up to 36 in. wide, and down to No. 16 gage. The unit will consist of a universal mill, which will be operated in conjunction with a single stand, 4-high mill, equipped with pinch rolls and coilers on either side of the mill. Rolling procedure consists of a reduction of a slab on the plate mill to a thickness of about 1 in., and further rolling without reheating on a 4-high reversing stand, equipped with coilers, to the finished gage desired.

The above installation will be the first commercial application of the Steckel hot mill, although experimental rolling has been carried on in the Youngstown plants of the Youngstown company since the middle of 1932. A number of successful installations of the Steckel cold mill have been made in both the steel and non-ferrous industries, and the process has been described in detail in THE IRON AGE.

## Locomotive Shipments

JANUARY shipments of railroad locomotives from principal manufacturing plants, reported to the Bureau of the Census, totaled four, as compared with eight in December, two in January, 1933, none in January, 1932, and 16 in January, 1931. Unfilled orders at the end of January, 1934,

totalled 80, as compared with 74 at the end of December, 71 at the end of January, 1933, and 177 at the end of January, 1932, and 110 at the end of January, 1931.

## National Standard Buys Worcester Wire, Inc.

THE National Standard Co., Niles, Mich., has purchased the physical assets of the Worcester Wire Works, Inc., Worcester, Mass., for about \$145,000, which will be operated as a division of the Niles company. The current staff of the Worcester plant will remain unchanged, except that Nils Bjork will retire to devote his entire time to the banking business.

## Scrap Institute Chapters Elect Officers

SEVERAL local chapters of the Institute of Scrap Iron and Steel elected officers for the ensuing year during the past week. Walter Bregman, president, Price Iron & Steel Co., has been elected president of the Chicago chapter. John T. McEnroe, of John T. McEnroe Co., has been elected vice-president; Arthur L. Jeffery, of Arthur L. Jeffery Co., treasurer, and Henry Rosenthal, of Briggs & Turivas, Inc., secretary.

The Cleveland-Detroit chapter has made Harry Grant, of the Grant Iron & Metal Co., Detroit, president; David Rotter, of the Rotter-Speer Co., Cleveland, and Carl Mirman, of the Akron Scrap Iron Co., vice-presidents. Joseph Vasek, of Max Friedman Co., Cleveland, is secretary and Abner L. Cohen, of M. Cohen & Son Co., Cleveland, treasurer.

D. H. Cohen, of the company of the same name, has been elected president of the Southwestern division, with offices in St. Louis. Other officers were named as follows: Vice-presidents, J. L. Foerster, Standard Steel & Rail Co., Gus Gillerman, of Gus Gillerman Iron & Metal Co., and C. C. Cohen, I. J. Cohen Co.; secretary, Fred S. Fuld, Harry Benjamin Equipment Co., and treasurer, Isaac Bierman, of F. Bierman & Sons Metal & Rubber Co.

William J. Wolf, Hamilton, Ohio, has been chosen president of the Cincinnati chapter. Other officers are Harry Goldberg, Columbus, vice-president; B. Hirshorn, Hamilton, secretary-treasurer.

## Announcement

EFFECTIVE Feb. 15, the Philadelphia office of THE IRON AGE, in charge of Charles Lundberg, will be removed to the Chilton Building, Fifty-sixth and Chestnut Streets, Philadelphia. Telephone, Sherwood 1424.

### British Prices, f.o.b. United Kingdom Ports

Per Gross Ton		
Ferromanganese, export .....	£9	
Billets, open-hrth. .....	£5 10s.	to £5 12s. 6d.
Tin plate, per base box .....	16s. 4½d.	to 16s. 7½d.
Steel bars, open-hearth .....	£7 17½s.	to £8 7½s.
Beams, open-hrth. .....	£7 7½s.	to £7 17½s.
Channels, open-hearth .....	£7 12½s.	to £8 2½s.
Angles, open-hearth .....	£7 7½s.	to £7 17½s.
Black sheets, No. 24 gage.....	£9 5s.	
Galvanized sheets, No. 24 gage.....	£11 5s.	to £11 15s.

### Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £		
Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.		
*Ingots .....	£2 5s.	
*Billets, Thomas .....	£2 7s.	
Wire rods, No. 5 B.W.G. ....	£4 10s.	
*Steel bars, merchant .....	£3 2s. 6d.	
*Sheet bars .....	£2 8s.	
Plates, ¼ in. and up .....	£4 1s. 6d.	
*Plates, 3/16 in. and 5 mm. ....	£4 3s. 6d.	
*Sheets, ¼ in. ....	£4 8s. 6d.	
*Ship plates .....	£4 10s.	
*Beams, Thomas .....	£2 19s.	
*Angles (basic) .....	£3 2s. 6d.	
Hoops and strip steel over 6-in. base .....	£3 17s. 6d.	
Wire, plain, No. 8 .....	£5 7s. 6d.	
Wire nails .....	£5 15s.	
Wire, barbed, 4-pt. No. 10 B.W.G. ..	£8 15s.	

\*Prices as established by European Raw Steel Cartel.

## Program of Oil Burner Association

A PROGRAM, designed to give every member of the oil heating industry a first-hand and close-up view of the nation-wide activity of the oil burner code authority, is in view for the program of the 11th National oil burner show and convention of the American Oil Burner Association, according to Harry F. Tapp, executive secretary of the A. O. B. A., who outlined a convention program for the week of March 5 to 9, in Philadelphia, that "will be nearer to the day-to-day working schedule of the industry than any previous program ever presented before an oil burner convention."

With respect to the oil burner show, which will be held in the exhibition hall of the Commercial Museum, located at Thirty-fourth St. below Spruce St., Mr. Tapp reported a space reservation that indicates the show "will eclipse in numbers and representative exhibits even the New York show in 1929, when the turnout passed all previous records."

Dealer Day has been set for Wednesday, March 7, when the morning will be given over to an "Oil Burner Code Merchandising Session" which will terminate with an open forum to be conducted by Assistant Deputy Administrator W. Schwan, representing the NRA. The Code Forum will be continued in the afternoon when the Dealer Division holds its annual meeting.

### Engineering Session March 9

The program of the Engineering Session on Friday morning, March 9, will include a joint paper on domestic temperature control problems by Nelson B. Delavan, and L. M. Persons of the Penn Electric Switch Co.; a paper on range burners by R. M. Sherman, of the Silent Glow Oil Burner Corp.; a paper on air conditioning by Andre Merle of the Clyde R. Place Co., consulting engineers, New York, and a paper on sales engineering by Dayle G. Malone, of the Petro-Nokol Co. of Chicago. An open forum will also be conducted at the close of this session at which Lionel L. Jacobs, president of Electrol of N. J., will preside.

The annual banquet and dance will be held in the Crystal Ball Room of the Hotel Benjamin Franklin on the evening of March 8, with guest speaker being Major R. B. Paddock, deputy administrator of the NRA. Edward P. Bailey, of the National Airoil Burner Co., will act as toastmaster, and the after-dinner address will be given by Dr. Edward J. Cattell, of Philadelphia.

Following meetings of the executive directors of the Dealer Division and a meeting of the executive committee of the A. O. B. A. on March 5, at the

Benjamin Franklin Hotel, which will be Association headquarters, the annual meeting of the association will be held on March 8, at the Benjamin Franklin followed by a meeting of the new directorate on the same day.

## Employers Must Post Code Labor Provisions

REGULATIONS requiring employers operating under approved codes to post the labor provisions of those codes conspicuously in their establishments have been issued by National Recovery Administrator Hugh S. Johnson.

Under the regulations, issued in accordance with a recent Presidential Executive Order, official copies of the hour and wage provisions of the code to which he is subject will be furnished to each employer. These official copies will include detailed directions for the proper filing of complaints of violations of the provisions.

"Such official copies," the regulations prescribe, "with such directions, shall be kept conspicuously posted at all times by such person in each shop, establishment or separate unit of his enterprise to the extent necessary to make them freely accessible to all employees."

Posting of the provisions is designed not only to acquaint employees with their rights under codes but also to protect employers from complaints made in ignorance of code provisions and to protect faithfully-complying employers from chiseling competitors.

## NRA Code Authority Members Named

WASHINGTON, Feb. 20.—National Recovery Administrator Hugh S. Johnson has announced the appointment of successor administration members on the code authorities of the following industries:

Boiler Manufacturing—James W. Hook, to succeed Neal W. Foster. Mr. Hook is president of the Geometric Tool Co., and has been a member of the resident staff of the NRA Industrial Advisory Board.

Textile Machinery—Cleon R. Johnson, to succeed George S. Brady.

Packaging Machinery—Alfred E. Waller, to succeed George S. Brady. For 17 years Mr. Waller was associated with the Ward Leonard Electric Co. More recently, he was managing director of the National Electrical Mfg. Association, and assistant director of sales for the General Cable Corp.

Grinding Wheel—Charles R. Baxter, to succeed A. C. Cook. Major Baxter was a member of the United States ordnance department selected

to attend the Harvard Business School and more recently was offered the position of general manager of a plant of the Kendall Co., manufacturer of surgical dressings.

Coated Abrasives—Frank E. Selley, to succeed A. C. Cook. Mr. Selley formerly was vice-president, treasurer and general manager of Abendroth Brothers, and served for five years in a managerial capacity with the American Radiator Co.

## New Hearing Date for Metal Culvert Code

ANNOUNCEMENT is made by the National Recovery Administration that the hearing set for Feb. 21, on the proposed code of fair competition for the Corrugated Rolled Metal Culvert Pipe Industry, has been postponed until March 2. The hearing, which will be held in Room 3208 of the Department of Commerce Building, will be conducted by Deputy Administrator C. L. Hickling. The proposed code was submitted by the Corrugated Rolled Metal Culvert Pipe Association, claiming to represent 76.6 per cent of the industry.

## Cupola Refractories Standardization

SIMPLIFIED Practice Recommendation R 154-34, Cupola Refractories, has been accorded the required degree of written approval by the industry and is to become effective March 15, 1934, according to an announcement by the Division of Simplified Practice, Bureau of Standards.

The recommendation which was proposed and developed by the industry covers the sizes and shapes of cupola lining blocks, tap-out and slag-hole blocks.

The recommendation represents a substantial reduction in the variety heretofore listed for regular stock purposes.

## A Correction

IN THE IRON AGE of Feb. 8, p. 41-H, was a report of the meeting held in Cleveland, Jan. 31, under the auspices of the Cleveland Engineering Society, the Cleveland Section of the A.S.M.E., and the A.F.A. This report incorrectly quotes Major R. A. Bull, metallurgical consultant, Chicago, as stating that "there are now two grades of alloy structural steel (for castings), covered by A.S.T.M. specifications."

Major Bull's actual statement was that the tentative specifications adopted by the Testing Society provide for eight grades of alloy cast steel for structural purposes.



# PERSONALS

R. G. RUSSELL has been elected vice-president and general manager of the Cyclone Fence Co., Waukegan, Ill., a subsidiary of the United States Steel Corp. He succeeds the late H. G. CHAPMAN. Mr. Russell entered the services of the Steel Corporation in 1909 as a clerk at the Waukegan works of the American Steel & Wire Co. In 1911 he became associated with the Cyclone company and has successively held the positions of salesman, branch manager at Fort Worth, Tex., and vice-president and general manager of the Standard Fence Co., the Pacific Coast subsidiary of the Cyclone company.

♦ ♦ ♦

RAY J. FITNESS has been appointed chief engineer of the Reo Motor Car Co., Lansing, Mich., succeeding H. T. THOMAS, who will devote his time to the duties of chief research engineer. Mr. Fitness for the past three years has been experimental engineer with the Chrysler Corp. and has been associated with Chrysler for 10 years. He has been connected with the automobile industry for 27 years, having served with Continental Motors, Studebaker and Dodge Brothers.

♦ ♦ ♦

S. A. WOODMANCY has been made manager of the gear and axle plant of the Chevrolet Motor Co. at Detroit. He recently has been manager of the transmission plant of the Chevrolet company at Toledo, Ohio.

♦ ♦ ♦

ELLERY L. WRIGHT, general manager, Chevrolet Motor Co. and Fisher Body Corp. branch plants at Janesville, Wis., has been advanced to general manager at Tarrytown, N. Y. He is succeeded at Janesville by GEORGE LOW, formerly manager at St. Louis, who in turn is succeeded by P. G. BAUGH, formerly manager at Tarrytown.

♦ ♦ ♦

C. V. MURRAY has become connected with the New York branch, 30 Church Street, of the Patterson Foundry & Machine Co., East Liverpool, Ohio. He is well acquainted with the trade, having served the New York territory for over 13 years as sales engineer for the Robinson Mfg. Co., Muncy, Pa.

♦ ♦ ♦

H. A. BRASSERT has returned from London where his English company has undertaken the contract for the construction and operation of a new iron and steel plant which is being erected at Corby, Northamptonshire, for Stewarts & Lloyds, Ltd. The plant, which is located on the large iron ore field of Northamptonshire, will consist of ore crushing and sintering plant, two blast furnaces, by-product



R. G. RUSSELL

coke plant, basic Bessemer plant, blooming mill and strip mill. A tube plant is being erected by Stewarts & Lloyds adjoining the steel works.

♦ ♦ ♦

C. DONALD DALLAS, president of Revere Copper and Brass, Inc., announced the following changes in the general sales department of the company:

J. A. DOUCETT, formerly vice-president and general sales manager, has been appointed vice-president in charge of sales, and C. A. MACFIE, formerly assistant sales manager, becomes general sales manager.

In his new position Mr. Doucett will give special attention to matters pertaining to the NRA code of fair competition of the copper and brass mill products industry, as well as to company policies, and Mr. Macfie will devote his time to general company sales activities.

Both Mr. Doucett and Mr. Macfie have had long experience in the copper and brass industry. Before coming to Revere, Mr. Doucett was connected with the American Brass Co. in its branches at Buffalo and Kenosha, and later was vice-president of the Michigan Copper & Brass Co. in Detroit, now the Michigan division of Revere.

Mr. Macfie was at one time manager of the copper sales department of the U. T. Hungerford Brass & Copper Co. Later he was the New York sales agent for sheet copper products of the Rome Brass & Copper Co., now the Rome division of Revere, and in 1929 came to Revere as manager of merchandise sales for the New York district. In August,

1931, he joined the general sales department as assistant sales manager of Revere.

Both of these men will be located at the Revere executive offices at 230 Park Avenue, New York.

♦ ♦ ♦

H. S. SCHROEDER, formerly Western manager for the Republic Steel Corp. with headquarters in Chicago, has been appointed Chicago district sales manager of the LaSalle Steel Co., Chicago. Before his connection with the Republic company, Mr. Schroeder was vice-president and general sales manager of the Interstate Iron & Steel Co., Chicago.

♦ ♦ ♦

C. E. WADE, general manager of the Lakey Foundry & Machine Co., Muskegon, Mich., has been named vice-president, retaining the post of general manager, succeeding W. R. Angell. F. E. Cook has been made secretary-treasurer.

♦ ♦ ♦

C. O. ANDERSON, formerly with the Leeds & Northrup Co., Philadelphia, and more recently with the Claude S. Gordon Co., Chicago, has been made vice-president and general manager of the Pyrometer Service & Supply Corp., Cleveland, a subsidiary of the Gordon company.

♦ ♦ ♦

F. E. HARRELL, who has been identified with the Reliance Electric & Engineering Co., Cleveland, since his graduation from Purdue University in 1924, has been appointed assistant chief engineer. Following sales engineering work in Chicago, he returned to Cleveland as special engineer for steel mill motor applications. He has since been chief draftsman and engineer in charge of a.c. design. J. L. VAN NORT, who has heretofore represented the Reliance company in the New England and Cincinnati districts, has been transferred to the Chicago office.

♦ ♦ ♦

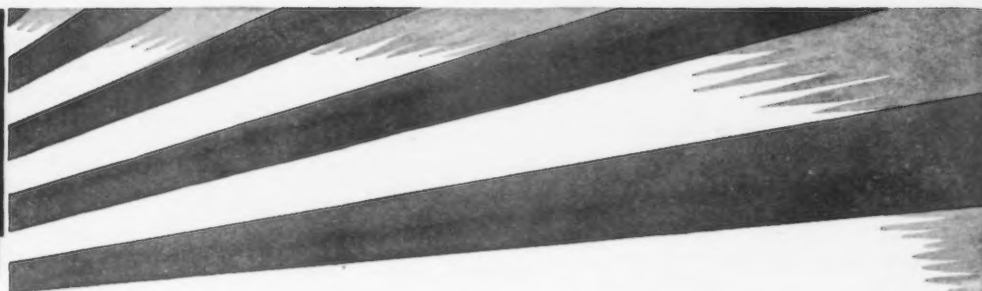
F. B. COYLE, metallurgist, development and research department, International Nickel Co., Inc., New York, is to address the Springfield, Mass., section of the American Society for Metals on Feb. 26 on "American Progress in the Use of Alloys in Cast Iron."

♦ ♦ ♦

C. I. COLLINS has been appointed superintendent of the Cuyahoga Works of American Steel & Wire Co., Cleveland, succeeding J. T. LEACH, who has been transferred to other duties. Mr. Collins formerly was general manager of the Morris & Bailey Division, Pittsburgh, and after that division was absorbed by the American Steel & Wire Co. he had been engaged in special work in Cleveland.

♦ ♦ ♦

ARTHUR D. RAMSEY, sales manager of the Pittsburgh Rolls Corp., Pittsburgh, has been elected vice-president of that company.



THIS WEEK IN WASHINGTON

## NRA Gets "Goldfish" Bowl Ready For Business

*General Johnson Invites Constructive Criticism of Effects of Code Operation from All Quarters*

WASHINGTON, Feb. 20.—Currying the NRA with a fine-toothed comb is about to begin. Jumping the gun to outdo scattering but growing criticism, National Recovery Administrator Hugh S. Johnson has invited a concentrated attack by John Q. Public. He intends that critics shall get the load off their chests at a mass gathering in Washington beginning Feb. 27. Dead cats are expected to be flying more thickly than they have ever flown before. But once the mass movement has passed, the NRA expects to find itself safely entrenched and equipped to realine its forces on a stronger basis to withstand future sieges. Meanwhile it apparently hopes to disarm many of its critics, Senatorial and otherwise.

The public meetings are to be held for the purpose of developing "constructive criticisms and suggestions regarding policies and code administration." Meanwhile broad, though more exclusive criticism, likewise has been invited from more than a score of the country's outstanding economists and marketing experts, many of them avowed opponents of NRA. These experts have been asked to join the Administration in the study of open price associations. This study is being conducted by Division Administrator A. D. Whiteside and Colonel Robert H. Montgomery, chief of the NRA Research and Planning Division.

The public meetings will be held in a goldfish bowl. To be broken into five groups, they will take place

By L. W. MOFFETT  
Resident Washington Editor  
THE IRON AGE

at the Department of Commerce auditorium and four hotels, each group to deal with phases of codes and their administration. Recommendations as to the NRA open price association problem are asked by the experts in order to aid it in determining a policy on this controversial and important subject.

### Results Will Be Laid Before March 5 Meeting

Both the public gathering discussions and the expert suggestions on the price policy are to be laid before the general code conference to begin March 5. To this conference have been invited code authorities from all industries having approved codes. It has been estimated that if there is full attendance some 7000 business and industrial interests will trek to Washington and participate in by far the most formidable sessions ever held under the aegis of the Blue Eagle. For these sessions, some to be open and others closed, will have enormous quantities of data before them. No doubt much material will be brought to Washington by the code authorities themselves, thus supplementing data coming from the public meetings and the NRA itself.

Codes will be analyzed from every conceivable angle. While it is per-

haps wide of the mark to say they will be greatly reshaped, it is expected that important changes in policies governing them may be made. This promises to be particularly true as to prices, wages and hours. The sharpest criticism has been made against alleged price fixing, with charges of "oppressing" small enterprises ranking a close second. The two are directly connected. These criticisms have risen to such a high tide that the NRA has been compelled to recognize them. For this reason the move of General Johnson to invite them from the public is held to be a smart maneuver, and one that is designed to forestall further general sniping.

The major codes, those covering the steel and other heavy industries, have been the special target of many of the attacks, and their consideration at the public meetings, by the economists and marketing experts, as well as at the general code conference, is being awaited with deep interest.

The program, however, is not one of criticism only. For it is a broad schedule calling for suggestions of NRA policies that it is hoped will stimulate industry and employment.

### Five Principal Topics

This is readily seen from the schedule laid out for the public meetings. Its five topics and places of their discussion are:

Employment—Department of Commerce Auditorium.

Trade Practices—Willard Hotel.



Trade Practices—Washington Hotel.

Code Authority Organization—Mayflower Hotel.

Small Enterprises and Minorities—Raleigh Hotel.

Under the subject of employment consideration will be given to possibilities of increasing employment; wages and hours, and the comparative situation of capital goods and consumer goods.

General Johnson has said that hours will have to be shortened and while he has suggested the 32-hr. week, it is known that what really is in mind is the 36-hr. week. It would not be applied generally and it is likely that the capital goods industries would escape its application generally, at least until they have picked up considerably. The chief aim will be to reduce the hours in the white collar class just at this time. There also has been talk of increasing the rates of pay but here again there is a growing doubt that the heavy goods industries could take on additional financial burdens at present in the way of wage increases and since the consumer goods industries are in a better shape it is believed they will be asked to assume the greater part of this obligation.

Trade practices will be discussed in two phases. One will cover costs and prices, protection against destructive competition and against "excessive prices and monopolistic tendencies." This feature of the subject will be discussed at the meetings at the Willard Hotel. Its breadth is easily seen. Being a public gathering it may be expected that criticism will be made of rising prices and of alleged monopolistic tendencies, although defense likewise may be expected on these subjects, based on added costs by reason of code operation. This particular angle of code operation lends itself to discussion that has surrounded that growing out of the steel code. Being a major code, attacks against it necessarily have attracted attention. It has also been a source of conflict between the NRA and the Federal Trade Commission.

#### F. T. C. Making Steel Price Investigation

The Commission forced itself into the picture by making a report on the code to the White House. It is still withheld from the public view but it is said to deal chiefly with the basing point system. At odds with the NRA, Senator Borah made it more uncomfortable for General Johnson by putting through a resolution calling upon the Commission to make an investigation regarding the steel code operation, its effect on prices, etc. This investigation now is under full sway and is in charge of Chief Counsel Healey of the Commission. It is cer-

tain that the investigation will deal extensively with prices and the basing point system. It would not be surprising if this subject would come up at the public meeting discussion on trade practices and laid before the Steel Code Authority at the general code conference.

At the Washington Hotel trade practices from another angle will be discussed. They will also cover a wide range. They will include control of production; limitation of machine hours; restriction of expansion of facilities and ethical practices regulating competitive relationship.

Control of production has been recognized by NRA but its more recent policy appears to be turning against either control of production or restriction of facilities, though the subject still is a lively one. Limitation of machine hours is more widely recognized.

Code Authority organization to be discussed at the Mayflower Hotel includes the following: Code administration, including compliance and enforcement; inequalities, inconsistencies and overlapping in codes; inter-industry and inter-code coordination; the financing of code administration; use and control of the Code Eagle.

Here is another broad subject and like preceding ones probably could be discussed endlessly. Nevertheless, it is hoped to get from the meeting important suggestions to smooth out operations of codes and their enforcement. The matter of enforcement suggests that the eternal labor question may project itself into this discussion more extensively than at other discussions and it may well be expected that organized labor will appear in force at this as well as the other meetings.

#### Position of Small Enterprises

Small Enterprises and Minorities, to be discussed at the Raleigh Hotel meeting, will be considered from the point of operation of codes in small enterprises and the position of minorities. The so-called small enterprises have been pictured as forgotten enterprises in Senatorial discussion. General Johnson has taken a different view. Often, he has indicated, some small enterprises are complaining that they have to raise wages and shorten hours of work and no longer are able to chisel prices.

Persons desiring to be heard at these gold fish bowl sessions have been asked to file requests, by letter or telegraph, before noon Feb. 26, stating the persons or groups represented and outlining, without argument, the criticism or suggestions to be offered. Notices of the meetings have been sent to trade associations throughout the country.

Invitations to economists and marketing experts to join in the NRA

study of the open price association problem were extended at the suggestion of General Johnson by Leon Henderson. Mr. Henderson, a director of the Russell Sage Foundation, has been an outspoken critic of certain NRA policies. Recently he was named by General Johnson to act as a special assistant to observe and advise on code operation from the consumers' standpoint. General Johnson frequently asks critics to join the NRA staff and claims he has made a number of converts as a result.

#### Experts Invited to Make Recommendations

Among the numerous experts invited to recommend specific points for inclusion in the open price study are Dr. Frederick C. Mills, National Bureau of Economic Research; Dr. Frank Fetter, Princeton University; Dr. Virgil Jordan, director, National Industrial Conference Board; Miss Mabel Lewis, authority on cartels; Frederick Dewhurst, who recently completed an exhaustive study of the stock market for the Twentieth Century Fund; Dr. Walton Hamilton, Yale University; Edward Morehouse, Wisconsin Public Service Commission; Dr. Arthur M. Burns, Columbia University; Commissioner James Landis and Dr. W. H. S. Stephens, staff expert, Federal Trade Commission; Dr. John R. Commons, University of Wisconsin; E. Dana Durand, staff expert, Tariff Commission; Walter Rice, Department of Justice.

Pointing out in his letter to these experts that the Administration's study of the open price association problem is a direct result of the recent price charge hearings, Mr. Henderson forwarded each a copy of Mr. Whiteside's "interim" report on the price hearings which the letter suggested as "a basis for your comments and recommendations." It was not only the price hearings that altered the price policy of the NRA. Senatorial and other criticism had a great deal to do with it. In his "interim" report, Mr. Whiteside suggested that the so-called "waiting period" (time between filing prices and date of their effectiveness) should probably be temporarily deleted from the majority of open price provisions. This policy now is in effect as to pending codes. It is considered that its permanent application will do away entirely with so-called price fixing, which it is planned to replace by a proposed cost system now under investigation. However, it is believed different policies may apply to different codes. The suggestion has been made that price fixing for raw resource industries likely will remain. This plan is set up, for instance, in the bituminous coal code, and it is significant that it promises to remain because of the insistence upon it by organized labor which is just as determined as that

association  
t the sug-  
n by Leon  
n, a direc-  
oundation,  
tic of cer-  
tly he was  
to act as  
ve and ad-  
n the con-  
eral John-  
s to join  
has made  
result.

ake

experts in-  
points for  
study are  
tional Bu-  
rch; Dr.  
niversity;  
National  
rd; Miss  
cartels;  
recently  
dy of the  
eth Cen-  
Hamilton,  
orehouse,  
nmission;  
bia Uni-  
s Landis  
staff ex-  
sion; Dr.  
y of Wis-  
staff ex-  
ter Rice,

to these  
stration's  
association  
of the re-  
Mr. Hen-  
y of Mr.  
on the  
ter sug-  
omments  
was not  
altered  
Sen-  
a great  
interim"  
ted that  
" (time  
of their  
be tem-  
majority  
s policy  
g codes.  
manent  
ely with  
a it is  
sed cost  
n. How-  
policies  
s. The  
at price  
ustries  
is set  
minous  
that it  
the in-  
d labor  
as that

of the coal operators themselves. Mr. Whiteside in his report also suggests for further study the matter of the difference in effects of open price reporting between (1) industries making staple necessities; (2) industries dealing with retail trade; (3) industries producing luxury and highly seasonal products; (4) industries beset by active competition of substitutes. He likewise suggested further study as to the basis of price quotations, which would vary with the character of the industry, but to include (1) delivered prices; (2) prices f.o.b. basing point; (3) prices f.o.b. producing point; (4) prices not less than those of local producers.

#### Simplification and Reorganization May Follow

Once these intricate problems are thrashed out, if that task is possible, the NRA promises to have simplified its work considerably. It has become so unwieldy, its problems so vast and numerous, constantly multiplying, that some of its best supporters have doubted that it could continue to function at all satisfactorily unless it was able to reduce itself to a simpler basis of operation.

Apparently this plan of decentralization was in mind in connection with its recommendations of last week that regional codes or Presidential Agreements be adopted to supplement national codes for local trade and service enterprises. These numerous enterprises, the sources of many complaints and difficulty for NRA, are now expected to turn to self-government, with as little interference as possible by the NRA, which no doubt is extremely desirous of throwing the load off its already over-burdened shoulders. It is also quite likely the NRA move was inspired partly by doubt as to its authority over these services, purely of intrastate character.

The NRA long has seen the difficulty of enforcing codes on concerns engaged purely in intrastate business, which explains why it has been anxious to have state laws patterned after the National Recovery act.

## Nickel Plate R.R. Loan Approved

WASHINGTON, Feb. 20.—The Interstate Commerce Commission has approved an application of the New York, Chicago & St. Louis (Nickel Plate) railroad for a PWA loan of \$5,028,208 to be used for the purchase of the following equipment: 15 freight and five yard locomotives, 20 tenders, seven passenger coaches, one steel mail baggage car, 500 50-ton steel box cars, 675 55-ton steel gondolas and 25 55-ton flat cars. Allotment for the loan has been made by the PWA.

## Republic Steel Corp. Defends Birmingham Employee Plan

WASHINGTON, Feb. 20.—Taking the same position as that of the steel industry generally, Thomas F. Veach, counsel for the Republic Steel Corp., told the National Labor Board at a hearing last Thursday that the company will take such steps as are lawfully necessary to uphold the employees' representation plan.

The proceeding was based on charges of representatives of the Mine, Mill and Smelter Workers' Union that the Republic company was fostering a "company union" in its Birmingham division. The case came before the National Labor Board from the Southeast Regional Labor Board at Atlanta, Ga. On Jan. 16, the Atlanta Board handed down a decision calling for reinstatement of strikers at the Raimund mine of the company who quit work last December because, they claimed, the company refused to recognize the Smelters' Union, affiliated with the American Federation of Labor, which was organized at the Raimund mine and the Thomas furnace.

Presiding as chairman of the Board, Pierre S. duPont asked whether the employees had "absolute control of the (employees' representation) plan." Mr. Veach replied that while the men had power to initiate changes, they could not change the fact that the company has representatives on the control committee functioning under the system. It was pointed out that there is equal representation between the company and employees on the committee, but that full attendance with two-thirds vote is necessary to effectuate any action by the committee.

Asked by President William Green of the American Federation of Labor, a member of the National Labor Board, if the company would deal with "freely elected representatives of the workers," Mr. Veach replied that "when that question is presented to us, the answer will be the same as in the captive mine case. We will recognize individuals as representatives of the men, but not the union as such."

#### May Hold Election in June

The company might be willing to have an election in June, but "it would not be fair to our employees to have it now," the Board was told by Borden Burr, also counsel for the company. Asked by Mr. duPont if he would be willing to hold the election were he satisfied the employees wanted it at this time, Mr. Burr said

he would not be, since there would be no way to determine the will of the employees in that matter.

Mr. duPont asked as to whether the company would be willing to "retire from the committee in order to perfect the plan for holding an election," rather than to have the plan thrown out and an entirely new one put in. William P. Belden, Cleveland, also of Republic counsel, said that "I want to tell you what we lawyers would recommend to our executives upon that point." He said the Weirton plan has been changed in this direction and he would recommend it in the Republic case. First, he suggested that the qualification of a year's employment for a worker committee representative be suspended during the life of the NRA and secondly, that while joint committees may consider all matters, company representatives on such committees may have no vote, leaving determination solely to the elected worker committee members. However, Counsel Belden said this question "is purely academic here."

According to the testimony, the Smelters' Union in January secured a petition of 415 names at the Raimund mine and 314 at the Thomas furnace protesting the company election last June and attesting their union membership. It was charged by the union that four employees were discharged by the company because of union activities.

#### Board Jurisdiction Questioned

The Atlanta decision held that the action of the employees in drawing up their petition was valid, that the management should recognize the outside representatives and bargain collectively with them. The company rejected the findings, and, according to the Board, indicated its non-acquiescence in the holding of an election and questioned the jurisdiction of the Board.

In his general statement, Mr. Veach told the Board the NRA called for collective bargaining and "in furtherance of this idea the company submitted a plan of representation to the employees," which indicated a willingness on the part of the company to deal with the men. He stated it is a matter of common knowledge that someone would have to take the first step in the preparation of a plan.

Subsequently, Mr. Veach said, secret ballots were held by the men to choose representatives, with more than 90 per cent of the men at the Raimund mine and Thomas furnace voting.



While the plan contained a restriction that in order to be eligible to vote a man must be employed for at least 90 days, Mr. Veach said this was not enforced. He stated that no outside names were posted on the ballots and that the men did not desire to have any outsiders to represent them.

Mr. Veach told the Board that the plan worked satisfactorily for several months with no strife or trouble among the men until officers of the union who were not employees of the company called upon company officials and presented complaints "which were admitted on all sides to be of no great importance." Following refusal to recognize these men, Mr. Veach said, a strike was called on Dec. 17, a hearing was held on Jan. 16 at Atlanta and the strike was called off "without prejudice to the company or to the union." Mr. Veach denied the validity of the petitions and stated that the company "owes a moral duty to recognize the representatives duly elected by the men in their election last June by secret ballot." He said another election was scheduled for June of the present year when all question as "to who should represent the men can and will be settled in an orderly fashion." He maintained that there was no dispute with the employees but "there is simply an attempt on the part of the American Federation of Labor to enlist all of our workmen in its organization and it seems to us there is present a gigantic attempt on the part of the American Federation of Labor to create in itself a monopoly of labor throughout the United States of America in violation of the prohibition of the National Industrial Recovery Act. He also declared that the company was not willing voluntarily to submit anything involved in the dispute to the Board of mediation, arbitration, determination or for any other purpose. He cited court decisions to sustain his position.

#### Endorses Institute Statement

Mr. Veach said the Republic company "endorses and adopts the statement of the steel industry" which was issued through the American Iron and Steel Institute after publication of the President's executive order on collective bargaining Jan. 31.

Mr. Veach told the Board that should it be willing "to adopt and follow the statements Recovery Administrator Hugh S. Johnson and NRA General Counsel Donald Richberg," in interpreting the President's executive order, "then it will reserve the order of the Regional Labor Board."

The point also was made by Mr. Veach that the Thomas furnace is under the iron and steel code, while the Raimund mine is under no code at all. Mr. Belden also told the Board

that it could not make any order regarding the Raimund mine because it is still under the law of the Supreme Court.

Mr. duPont pointed out that "it seems quite important under the act that the company should separate itself from the committee." He asked if it were considered "material to keep management membership on the committee, as well as surrendering

the voting power of management representatives." Mr. Belden replied that "as a general thing, for the purpose of proper contact, the company should have membership on the committee." In reply to a further question, Mr. Belden said he did not believe this to be in conflict with the law but that it is only due the employer that he should have representatives who sit on all committees.

## Three Railroads Contract With PWA for Equipment Loans

**W**ASHINGTON, Feb. 20.—Production this year of 11,575 freight cars, 100,000 tons of rails, 10 steam locomotives and 159 passenger cars for the Chesapeake & Ohio, Erie, Northern Pacific and Pennsylvania railroads will result from contracts aggregating \$33,028,000 covering loans by the Public Works Administration.

The contract with the Chesapeake & Ohio signed last Wednesday is for a loan of \$16,876,000 to be used for purchasing 7800 freight and 26 passenger cars, and the Erie contract covers a loan of \$11,282,000 for the purchase of 3775 freight and 133 passenger cars. The contract with the Northern Pacific is for a loan of \$1,220,000, to be used for the purchase of 10 new locomotives. The Pennsylvania contract is for a loan of \$3,650,000, with which to buy 100,000 tons of rails. The rails have been distributed as follows: Bethlehem Steel Co., 44,000 tons; Carnegie Steel Co., 42,000 tons; Illinois Steel Co., 8000 tons, and Inland Steel Co., 6000 tons. Previously contracts for another loan of \$77,000,000 were made to the Pennsylvania, which is building 7000 freight cars and 101 electric locomotives and completing electrification of its line between Wilmington, Del., and Washington.

The C. & O., Erie and Northern Pacific obtained competitive bids from car manufacturers and locomotive builders, and have awarded contracts for building all the equipment, subject to confirmation after signing of the PWA contracts by Public Works Administrator Ickes. The contracts with these three carriers are somewhat smaller than was originally allotted. The allotment to the C. & O. was for \$18,290,000; to the Erie, \$11,964,000, and to the Northern Pacific, \$1,250,000. The PWA announced that the allotments were made on the basis of the estimated cost of the equipment to be purchased, but that since then the three companies have obtained competitive bids from car and locomotive manufacturers which are lower than the estimated costs on which the allotments were based.

Contracts now have been signed by

Administrator Ickes covering \$7,953,905 of a blanket allotment of \$41,000,000 set aside by the PWA for loans to railroad companies desiring to purchase rails at \$36.375 per ton, announced by manufacturers after conferring with President Roosevelt and Federal Transportation Coordinator Joseph B. Eastman. These contracts will result in the manufacture of 170,514 tons of rails and several thousand tons of fastenings.

The Pittsburgh & West Virginia has made application to the PWA for a loan of \$331,000 for the purchase of three single articulated locomotives.

## Decision Reserved in Woodruff-Edwards Case

**W**ASHINGTON, Feb. 20.—The National Labor Board has reserved decision regarding the dispute between employees of the Woodruff-Edwards, Inc., Elgin, Ill., and the management which developed a strike last September when 29 members of the International Molders' Union walked out because they charged the company dismissed 26 union workers and refused to bargain collectively. The case was heard last Thursday. After the hearing parties to the dispute went into a conference to work out some way of putting the striking employees back to work. It had been suggested by the Board that a rotation system might be worked out at little expense to the company.

Through the company's counsel in Washington, E. L. Kemmerling, superintendent, advised the board that he would agree to establish a preferential list for the men still out to be taken back as rapidly as business will permit. Concerning the demand of the union that a rotation system be established, the company expressed willingness to agree not to increase the hours of present employees until the list of employees has been exhausted and at the same time to urge employees to voluntarily reduce the number of working hours to speed up reemployment.

ment rep-  
lied that  
purpose  
y should  
nmittee."  
ion, Mr.  
e this to  
but that  
that he  
who sit

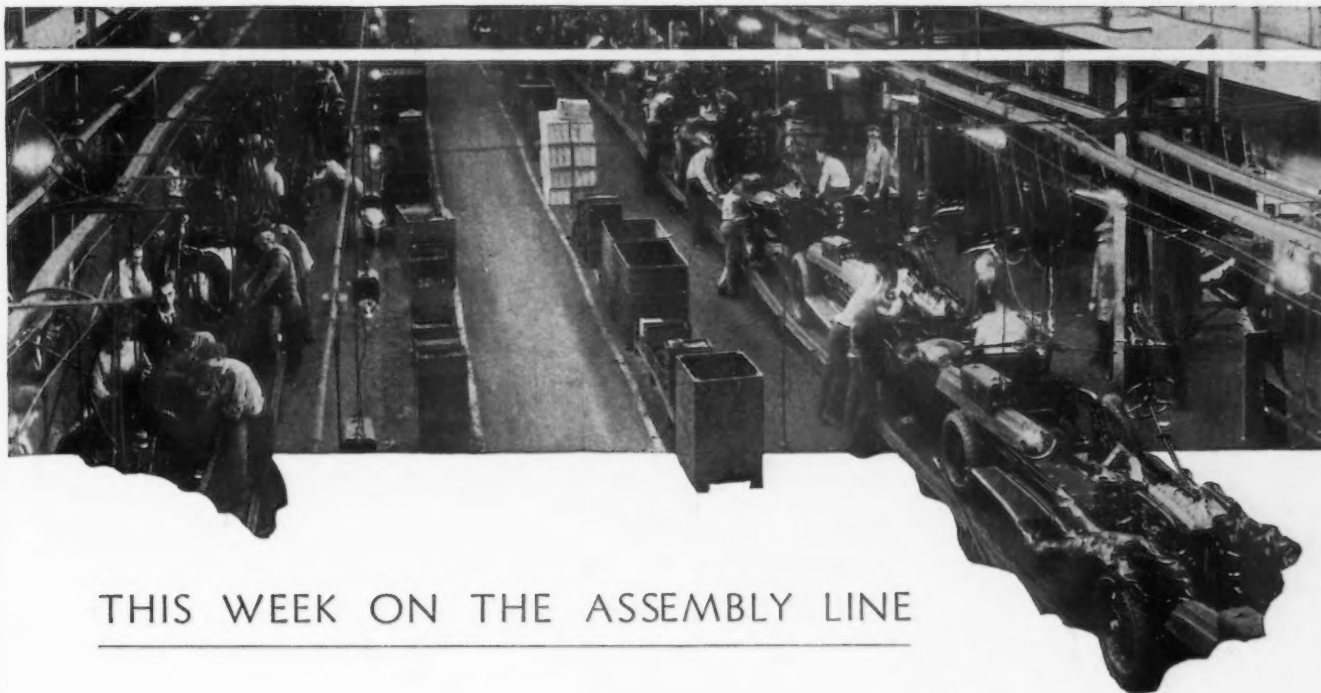
\$7,953,-  
\$41,000,-  
or loans  
to pur-  
ton, an-  
ter con-  
velt and  
rdinator  
ontracts  
of 170,-  
al thou-

Virginia  
WA for  
phase of  
tives.

Case

The Na-  
eserved  
ate be-  
odruff-  
and the  
a strike  
bers of  
Union  
ged the  
workers  
ctively.  
ursday.  
he dis-  
o work  
striking  
d been  
a rota-  
out at

nsel in  
erling,  
board  
lish a  
ill out  
s busi-  
he de-  
on sys-  
ny ex-  
to in-  
loyees  
been  
me to  
reduce  
speed



## THIS WEEK ON THE ASSEMBLY LINE

### Car Makers To Get Early Start On 1935 Tooling Programs

DETROIT, FEB. 20.

**T**HE machine tool business has traditionally been one of feast or famine. Violent upward swings have been followed by breath-taking plunges into the depths of depression. Just now it looks as though machine tool builders are in for one of their periodic feasts with a sumptuous repast being furnished by the automobile industry.

In the first six weeks of 1934 the volume of equipment buying at Detroit has been of notable proportions. It has come mostly from General Motors, especially from the Chevrolet Motor Co., and from the Chrysler Corp. Then one should not overlook the large tooling programs of the Buick Motor Co. and of Andre Citroen which materialized in huge machine tool orders during December.

Unless present plans go awry, this business may be considered only a forerunner of tooling programs in the next three or four months which have not been approached in size by the automobile industry since 1928.

Although manufacturing and sales problems in connection with 1934 models seemingly are absorbing the attention of motor car makers to the exclusion of everything else, they already are quietly laying their plans for 1935. They still are smarting from the very costly delays incident to tooling up for this year's production and have firmly resolved not to get caught again in such a tight situation.

Accordingly at least one important

company now is working on the blue prints for its 1935 tooling program and is expected to ask for bids on equipment probably in the next six weeks. This means that machine tool orders will be placed in April, whereas normally they would not be awarded until July or August. There is talk in well-informed circles that this particular program, involving machine tools, other types of production equipment, tools and dies, will call for an outlay of \$6,000,000 to \$8,000,000.

In its resolution to begin tooling up for next year at an early date, this company is no exception. Other manufacturers may not be out so soon with definite equipment purchasing programs, but all of them will see that the jam from which they now are extricating themselves does not occur again. This is said to apply with particular force to the car divisions of General Motors.

The exigencies of depression have worked against equipment expenditures at Detroit on the extravagant scale attained in the days when annual production ranged upward from 4,000,000 units. Because they had no assurance that the retail market would be sufficiently brisk to stand a stiff tooling expense, automobile makers have been content to make changes at a minimum capital outlay.

#### Industry Still Willing To Plunge

Yet no industry is so alert to take advantage of a favorable situation as the motor car industry. Its courage

to make a financial plunge, so long as it thinks the plunge has a good chance of success, is unimpaired after four years of depression. This is amply demonstrated by the recent spectacle of a leading company's spending \$4,000,000 for additional equipment within 48 hours without the flicker of an eyelash. One can well imagine the succession of meetings of boards of directors which would precede such purchases on the part of firms in many other industries.

To the seasoned automotive executive, the current year appears good for at least 3,000,000 units and 1935 should be a 4,000,000-car year. Hence manufacturers are thinking in terms of the biggest tooling programs since depression hit the United States. The warehouses of automobile companies still are filled to overflowing with used machine tools. However, in many cases the modern equipment among these stocks has been put back to work and rapidly is being worn out. In thousands of instances the machinery is said to be fit for little more than the junk pile. At least it would never be economical to operate it again on an automobile production line.

This opens the way for buying of new machine tools for 1935 cars on a grand scale. With an expected gain of a million units in sales and production next year, substantial investment in machinery to speed up operations and cut costs will be in order.

#### Expansion Hampered by Shortage of Materials

Automobile factory operations the past week were of about the same volume as the previous week, but expansion was hampered by shortages of bodies, parts and materials. Steel buying was heavy, with the Chrysler



Corpn. giving releases for large ton-nages to round out its requirements for the remainder of the current quarter. One of the largest sheet manufacturers is booked solid until April 1, and another prominent company can take no further business this quarter in cold-rolled sheets and hot-rolled strip. It is almost impossible to buy wide sheets for delivery this quarter.

Purchases of forging steel have widened, but demand in this branch of the steel industry continues considerably less than in flat-rolled steel. Motor car makers are taking no chances on a shortage of steel developing at their plants. In some cases they are asking mills as far distant as the Pittsburgh district to ship steel to Detroit by truck, rather than risk possible delays incident to railroad haulage.

Stamping plants in southern Michigan are understood to have about all of the work that they can handle at present because of the over-flow volume from automobile manufacturers. Chrysler, for example, is reported to have farmed out a large amount of stampings in an effort to build up a bank of parts for its assembly lines at its various plants. It is said that Chrysler's ability to reach its stiff goal of 72,000 units in February and 90,000 in March is directly dependent on its success in securing bodies, parts and materials in the necessary volume. Opinion in the trade is that assemblies are likely to fall considerably short of the desired goal.

The manufacturer of front-end units for the Chrysler six is scheduled to start today at Chrysler's Jefferson Avenue plant, equipment builders having done a rush job in supplying the necessary machine tools. It is said that most of the production now being carried on at the Newcastle, Ind., plant will remain there, although a few operations are understood to have been transferred to Detroit.

Chevrolet assemblies now are near the 4000-a-day mark, with manufacturing plants working six days a week, three shifts a day. Chevrolet is re-

ported to be scheduled to make well over 100,000 cars a month during March, April and May and probably June. Its factory payroll has soared to an all-time high of 56,545 workers. The previous record of 52,847 was attained in June, 1929. A year ago employment stood at 32,079. Present factory employment of the Chevrolet company is distributed as follows:

Detroit .....	16,807
Flint .....	15,725
Bay City.....	1,782
Saginaw .....	4,660
Toledo .....	2,571
Truck body and branch assembly plants...	15,000

The sharpest increase in Chevrolet's employment is in Detroit, where the payroll is twice that of a year ago. This is due in large measure to the added workers necessary in the manufacture of knee-action wheels. It is reported that A. O. Smith Corpn. has been awarded a contract by Chevrolet for a portion of its requirements of steel housings for coil springs.

#### Murray Gets Ford Frame Order

Ford is driving toward higher production ground, supposedly with an ambition to make 100,000 units in March. Murray Corpn. is said to have received an order for the fabrication of 20,000 Ford passenger car frames next month. This is the first release of passenger car frames from Ford in months and is in the nature of an overflow order to supplement the output at the Rouge plant. Murray recently has been doing some work in finishing stampings at its frame plant at Ecorse to relieve congestion at its main plant in Detroit.

Equipment for manufacture of the new light Buick is reported to be moving into the Buick factory at Flint. Production will begin in March and public announcement of the car is said to be scheduled for April. For the first time in four years Buick is working in multiple shifts. The transmission, differential, axle, forge and sheet metal plants are on three shifts a day and the assembly line on two shifts.

Buick's payroll totals 14,000, as against 8000 last year at this time.

Pontiac has increased its February schedule to 13,000 cars and its March program to 20,000. On Feb. 15 it had on hand orders for 25,000 cars for immediate shipment. Graham-Paige will make 2326 cars this month. To date it has received orders for 3000 of its 1934 cars and has shipped 1500.

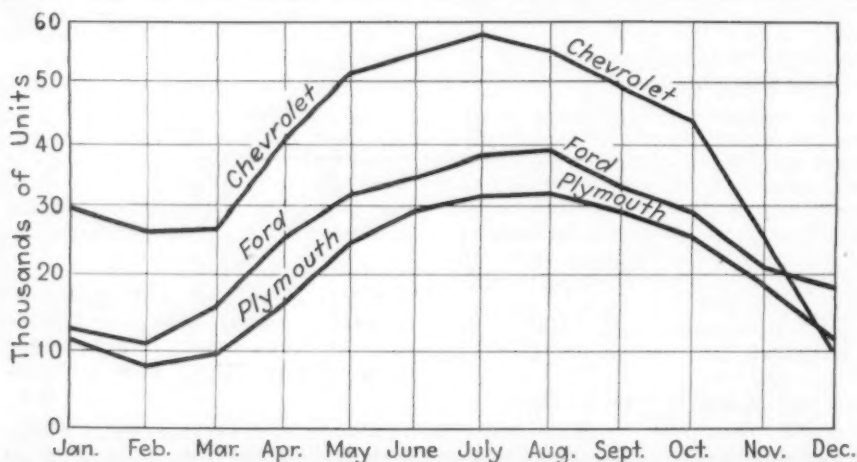
Auburn finally is in production on its 1934 models at its Connersville, Ind., plant. Unfilled orders total 3000 units, the largest bank since 1931. Contracts for materials and parts amounting to \$5,500,000 have been let to companies in Ohio, Indiana, Pennsylvania, Illinois and New York.

Ford Motor Co. spent \$33,500,000 for materials during January and \$7,500,000 for wages, of which \$5,500,000 was paid out in the Detroit area.

Airplane and automobile manufacturers in Yugoslavia are contemplating the purchase in this country of parts on a production basis and machine tool equipment for machining parts. Heretofore they have done their buying in France and Germany, but in view of the present exchange situation this business will be transferred to the United States if favorable terms can be arranged.

Orders for equipment to be used by the Yugoslavian army also may be placed here. Whitlock, Smith & Co., Penobscot Building, Detroit, is acting as the unofficial American agent for the group of Yugoslavian manufacturers. Peter Savo, a Yugoslavian affiliated with Whitlock Smith, is now visiting various plants for the purpose of recommending specific equipment and negotiating contracts.

Cadillac's production in January doubled and in February will treble that in the corresponding months of last year. Assemblies in March and April will be the largest for any two month period since 1928. Plymouth turned out 15,800 units in the first half of February and has orders on hand for 73,847 for February and March delivery. The factory is making about 1500 cars a day.



## How the Big Three Stood

1933 Domestic passenger car registrations. (Based on figures compiled by R. L. Polk & Co.)

## SUMMARY OF THIS WEEK'S BUSINESS

# Steel Operations Continue to Increase

Ingot Rate Reaches 44½ Per Cent—Cold Rolled Sheet Capacity  
Covered for First Quarter—Present Steel Prices  
Carry Over to Next Quarter

**G**AINING momentum on several fronts, the marshalled forces of recovery have pushed the steel operating rate up to 44½ per cent this week, a gain of three and a half points over last week and 25½ points over the corresponding week of 1933.

Automotive demand is still the chief single factor in the rise of steel activities. With evidences that this will be even augmented, with the PWA millions now beginning to penetrate basic industries and with the railroad rehabilitation program in definite action, the steel industry is expectant of well sustained demand and weekly increases in volume.

**A** DECIDED seller's market has developed for cold-finished sheets, due to the desire of motor car makers to cover present requirements. Mill capacity for this commodity is now well taxed for the remainder of the quarter, one large producer having been obliged to refuse a 1000-ton order during the past few days. Added to the demand from automotive centers has been the urge of automatic refrigerator makers to cover their sheet requirements. Strip steel specifications are also heavy, but mill capacity on this line is in position to take care of demands.

Shortages of bodies, parts and materials are hampering the expansion of motor car assemblies, operations this week being approximately on the same level as last. Stamping plants in southern Michigan are booked to capacity with the overflow from automobile works, and in the Chicago district malleable iron shops already well engaged on automobile work have had to refuse railroad business.

With the current year pointing to an output of at least 3,000,000 cars and with expectations of a 4,000,000 car production in 1935, some automobile companies are now figuring their tooling programs for next year. One company is expected, within the next six weeks, to ask for bids on tools and equipment aggregating between \$6,000,000 and \$8,000,000. Normally, equipment orders for the ensuing year are not placed until the previous July or August.

**P**RODUCTION during this year of 12,775 freight cars, 100,000 tons of rails, 30 locomotives and 163 passenger cars will result from contracts currently placed by the Chesapeake & Ohio, Erie, Northern Pacific, Pennsylvania and the New York, Chicago & St. Louis railroads, based upon PWA loans aggregating approximately \$40,000,000. Going ahead with its program of electrification, the Pennsylvania is preparing a series of quick releases for steel to follow that of 15,000 tons announced last week. This carrier has also distributed orders for 1,000,000 lb. of copper wire.

Books for the second-quarter deliveries of iron and steel will be opened March 1. The filing of price changes, if such were contemplated, was to be made on Feb. 19. Inasmuch as no changes of consequence were filed by that date, present prices will carry into the second quarter. This would indicate that steel makers hope to counterbalance their present higher costs and the accompanying losses through the economies of increased volume.

The present price of \$36.37½ per ton for steel rails will expire on March 1, unless producers agree to extend the time for placing rail orders at this price. No action to this end has yet materialized. Rail orders under the Eastman plan thus far placed approximate 330,000 tons, with an additional 270,000 tons actively pending.

**I**MPORTANT changes in NRA policy and possibly some decentralization may follow the public code hearing on Feb. 27 and the subsequent general code conference commencing March 5. Due to the fact that the chief industrial unemployment residuum is now in the capital goods industries, these industries will probably be excepted from resulting changes in hours and wages.

Fabricated structural steel awards this week totaled 14,925 tons, compared with 11,650 tons last week. Consumption of Lake Superior ore in January was 1,656,303 tons as compared with 661,116 tons in January, 1933.

THE IRON AGE composite steel scrap price has been advanced this week to \$12.25 per ton. There is no change in the composites for finished steel or pig iron.



# ▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous  
Advances Over Past Week in Heavy Type, Declines in Italics

## Pig Iron

	Feb. 20, 1934	Feb. 13, 1934	Jan. 23, 1934	Feb. 21, 1933
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia.....	\$19.26	\$19.26	\$19.26	\$13.34
No. 2, Valley furnace.....	17.50	17.50	17.50	14.50
No. 2 Southern, Cin'ti.....	18.13	18.13	18.13	13.82
No. 2, Birmingham†.....	13.50	13.50	13.50	11.00
No. 2 foundry, Chicago*.....	17.50	17.50	17.50	15.50
Basic, del'd eastern Pa.....	18.76	18.76	18.76	13.50
Basic, Valley furnace.....	17.00	17.00	17.00	13.50
Valley Bessemer, del'd P'gh..	19.76	19.76	19.76	16.89
Malleable, Chicago*.....	17.50	17.50	17.50	15.50
Malleable, Valley.....	17.50	17.50	17.50	14.50
L. S. charcoal, Chicago.....	23.54	23.54	23.54	23.17
Ferromanganese, seab'd car- lots.....	85.00	85.00	85.00	68.00

\*The switching charge for delivery to foundries in the Chi-  
cago district is 60c. per ton.

†This quotation is for delivery in South; in the North prices  
are 38c. a ton under delivered quotations from nearest Northern  
furnace.

## Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$36.37 ½	\$36.37 ½	\$36.37 ½	\$40.00
Light rails, Pittsburgh.....	32.00	32.00	32.00	30.00
Rerolling billets, Pittsburgh..	26.00	26.00	26.00	26.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	26.00
Slabs, Pittsburgh.....	26.00	26.00	26.00	26.00
Forging billets, Pittsburgh...	31.00	31.00	31.00	31.00
Wire rods, Pittsburgh.....	36.00	36.00	36.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.60	1.60	1.60	1.60

## Finished Steel

<i>Per Lb.:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.75	1.75	1.75	1.60
Bars, Chicago.....	1.80	1.80	1.80	1.70
Bars, Cleveland.....	1.80	1.80	1.80	1.65
Bars, New York.....	2.08	2.08	2.08	1.95
Plates, Pittsburgh.....	1.70	1.70	1.70	1.60
Plates, Chicago.....	1.75	1.75	1.75	1.70
Plates, New York.....	1.98	1.98	1.98	1.698
Structural shapes, Pittsburgh	1.70	1.70	1.70	1.60
Structural shapes, Chicago...	1.75	1.75	1.75	1.70
Structural shapes, New York...	1.95 ¼	1.95 ¼	1.95 ¼	1.86775
Cold-finished bars, P'gh.....	2.10	2.10	2.10	1.70
Hot-rolled strips, P'gh.....	1.75	1.75	1.75	1.45
Cold-rolled strips, P'gh.....	2.40	2.40	2.40	1.80

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of  
prices on various products, as shown in our detailed price tables.

## Finished Steel

<i>Per Lb.:</i>	Feb. 20, 1934	Feb. 13, 1934	Jan. 23, 1934	Feb. 21, 1933
	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.25	2.25	2.25	2.00
Hot-rolled annealed sheets, No. 24, Chicago dist. mill..	2.35	2.35	2.35	2.00
Sheets, galv., No. 24, P'gh...	2.85	2.85	2.85	2.50
Sheets, galv., No. 24, Chicago dist. mill.....	2.95	2.95	2.95	2.50
Hot-rolled sheets, No. 10, P'gh	1.75	1.75	1.75	1.45
Hot-rolled sheets No. 10, Chi- cago dist. mill.....	1.85	1.85	1.85	1.55
Wire nails, Pittsburgh.....	2.35	2.35	2.35	1.85
Wire nails, Chicago dist. mill.	2.40	2.40	2.40	1.90
Plain wire, Pittsburgh.....	2.20	2.20	2.20	2.10
Plain wire, Chicago dist. mill.	2.25	2.25	2.25	2.15
Barbed wire, galv., P'gh.....	2.85	2.85	2.85	2.35
Barbed wire, galv., Chicago dist. mill.....	2.90	2.90	2.90	2.40
Tin plate, 100 lb. box, P'gh..	\$5.25	\$5.25	\$5.25	\$4.25

## Scrap

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh....	\$14.25	\$13.75	\$13.50	\$8.50
Heavy melting steel, Phila....	11.75	11.75	11.75	6.75
Heavy melting steel, Ch'go...	10.75	10.75	10.75	5.25
Carwheels, Chicago.....	11.75	11.25	11.00	8.00
Carwheels, Philadelphia.....	12.75	12.75	12.75	8.00
No. 1 cast, Pittsburgh.....	12.25	12.25	11.75	9.00
No. 1 cast, Philadelphia.....	12.50	12.50	12.50	8.00
No. 1 cast, Ch'go, (net ton)...	9.50	9.50	9.50	6.25
No. 1 RR. wrot., Phila.....	11.00	11.00	11.00	7.50
No. 1 RR. wrot., Ch'go, (net)	9.25	9.25	9.25	4.50

## Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt.....	\$3.50	\$3.50	\$3.50	\$1.75
Foundry, coke, prompt.....	4.25	4.25	4.25	2.50

## Metals

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Electrolytic copper, refinery..	7.75	7.75	8.12 ½	4.75
Lake copper, New York.....	8.00	8.00	8.37 ½	5.00
Tin (Straits), New York....	52.00	51.65	51.62 ½	23.45
Zinc, East St. Louis.....	4.40	4.40	4.25	2.60
Zinc, New York.....	4.75	4.75	4.60	2.97
Lead, St. Louis.....	3.90	3.90	3.90	2.87 ½
Lead, New York.....	4.00	4.00	4.00	3.00
Antimony (Asiatic), N. Y....	7.15	7.15	7.20	5.62 ½

# ▲▲▲ The Iron Age Composite Prices ▲▲▲

## Finished Steel

Feb. 20, 1934	2.028c. a Lb.
One week ago	2.028c.
One month ago	2.028c.
One year ago	1.923c.

Based on steel bars, beams,  
tank plates, wire, rails, black  
pipe, sheets and hot-rolled strips.  
These products make 85 per cent  
of the United States output.

	HIGH	LOW
1933.....	2.036c., Oct. 3;	1.867c., Apr. 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

## Pig Iron

\$16.90 a Gross Ton
16.90
16.90
13.56

Based on average of basic iron  
at Valley furnace and foundry  
irons at Chicago, Philadelphia,  
Buffalo, Valley and Birmingham.

HIGH	LOW
\$16.90, Dec. 5;	\$13.56, Jan. 3
14.81, Jan. 5;	13.56, Dec. 6
15.90, Jan. 6;	14.79, Dec. 15
18.21, Jan. 7;	15.90, Dec. 16
18.71, May 14;	18.21, Dec. 17
18.59, Nov. 27;	17.04, July 24
19.71, Jan. 4;	17.54, Nov. 1

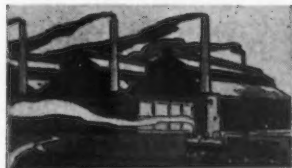
## Steel Scrap

\$12.25 a Gross Ton
12.08
12.00
6.83

Based on No. 1 heavy melting  
steel quotations at Pittsburgh,  
Philadelphia and Chicago.

HIGH	LOW
\$12.25, Aug. 8;	\$6.75, Jan. 3
8.50, Jan. 12;	6.42, July 5
11.83, Jan. 6;	8.50, Dec. 29
15.00, Feb. 18;	11.25, Dec. 9
17.58, Jan. 29;	14.08, Dec. 3
16.50, Dec. 31;	13.08, July 2
15.25, Jan. 11;	13.08, Nov. 22

# Marked Expansion in Valley And Wheeling Districts



**Mounting Railroad and Automotive Demands Increase Pittsburgh Rate Also — Scrap Increasingly Strong**

**P**ITTSBURGH, Feb. 20.—Further improvement in finished steel demand in this and nearby districts and better prospects for railroad buying have accompanied another rise in steel ingot production. At the same time the failure of leading makers to file higher prices on steel products on Feb. 19 indicates a continuance of the current quotations through the second quarter and would seem to fortify the belief that the steel industry expects increased volume in the second three months of the year to bring about further reductions in the cost of production. Price advances on semi-finished steel, sheets and strip had been widely discussed earlier in the quarter, but under practical operation of the code increases would have to be filed with the institute 10 days before March 1, if second quarter contracts were to be affected.

The approach of March also has focused attention on the market for rails and track accessories, as a commercial resolution under the code provides that sales of these products must have been made by March 1 if extension of contracts to June 30 were to be permitted. Thus far the carriers have ordered approximately 330,000 tons of rails, to be financed by PWA loans, and 270,000 tons are actively pending. This would leave more than 250,000 tons to be placed if the full tonnage promised by the Coordinator of Transportation last fall were to materialize.

The Pennsylvania has allocated 60,000 to 70,000 tons of steel for its car building program, and work is expected to begin immediately. Financial details and the placing of specialties have held up steel orders from the car builders, who shared in the recent purchase of the Van Sweringen roads.

Although mills in the Pittsburgh district are naturally much interested in railroad tonnage, automotive demand continues to feature the market. With March automobile production expected to exceed February by a large margin, motor car builders are placing steel freely, and increased orders have boosted production to nearly 60 per cent of capacity. Hot-rolled strip mills are just as busy, and automotive requirements are beginning to be felt by makers of bars,

whose business had heretofore been somewhat neglected.

Steel ingot production in the Pittsburgh district has risen to 27 per cent of capacity, following a much sharper increase last week. Small independents continue to lead in output, although the leading interest is now increasing its operations sharply. In the Valleys production has crossed the 50 per cent level, with certain large makers turning out steel at a much higher rate. In the Wheeling district, where tin plate, sheet and strip steel capacity predominates, steel-making operations are estimated at 80 per cent. With the exception of sheets and strip steel, output of finished steel products is essentially unchanged. The scrap market is increasingly strong, with a further increase of 50c. a ton in No. 1 heavy melting steel reported.

## Pig Iron

The filing of a price of \$17, Neville Island, on basic pig iron, to become effective Feb. 25, was the outstanding development in this market last week. This reduction of 50c. brings the Neville Island price to the same level as that which prevails in the Valleys, and sets up an entirely new competitive relationship. When the Neville Island furnace resumed production as a merchant interest in 1929 it was planned to maintain prices at a constant differential of 50c. a ton over the Valley bases. This relationship is expected to be continued on foundry, malleable and Bessemer iron, which are unchanged in price. The reduction in basic iron is the second concession which has been made this year to large users of this material on the Ohio, Monongahela and Allegheny Rivers. A commercial resolution adopted by the directors of the American Iron and Steel Institute in January provided for deductions of 60c. a ton from the all-rail delivered price of iron if water shipments were utilized. The market continues quiet, although a Valley merchant producer expects to blow in a furnace next week in order to supply the demands of an ingot mold plant.

## Semi-Finished Steel

With the date passed at which new prices might be filed to be effective for the entire second quarter, the

talked-of increases in price on billets, slabs and sheet bars have not yet materialized. Although it is possible under the code to file new prices at any time, no immediate action is now expected. In the meantime, shipments of all forms of raw steel have improved, the most noticeable gain having been in the case of sheet bars to makers of tin plate. However, both sheet and strip mills are increasing their requirements regularly. Forging billets continue comparatively active, although wire rods have failed to show substantial improvement.

## Rails and Track Accessories

Inquiry for 40,000 tons of rails from the New York Central is the feature of the market this week. The Erie is also expected to take action on a tentative inquiry for 30,000 tons of rails before the end of the month. Both of these orders involve the necessary track supplies. The Boston & Albany has ordered small tonnages of tie plates and spikes from local producers. No other outstanding orders are before the trade, and current specifications continue light. The Van Sweringen roads are allocating specialties required for their recent car purchases.

## Bolts, Nuts and Rivets

With railroad demand continuing to develop, the bolt and nut trade is enjoying the best business in many months. The Pennsylvania has allocated approximately 2000 tons of rivets, bolts and nuts for the building of 6500 freight cars in its own shops, and heavy tonnages are expected to come from the car builders who are sharing in the recent orders of the Van Sweringen roads. Automotive demand for bolts and nuts is also stronger, although shipments to the structural steel fabricating industry continue to lag.

## Cold-Finished Steel Bars

Business in this market has failed to show substantial gains, although moderate improvement continues. It is believed that consumers of cold drawn bars built up rather heavy stocks in December in order to take advantage of the lower base price as well as the quantity differentials offered on substantial tonnages. Under the circumstances, improved demand may lag behind other forms of finished steel, although it is believed that March will see renewed buying on a heavier scale.

## Bars

While demand for both merchant and alloy steel bars from the automotive industry still fails to keep pace with movement of sheets and strip steel to that consuming group, it is gradually improving. Gains are most noticeable in orders for alloy steel bars, on which no price change was made at the turn of the year. Fair stocks of merchant bars were apparently accumulated before the



1.75c., Pittsburgh, price became effective, but these are said to be rapidly diminishing. Demand for bars from miscellaneous sources seems to be slightly heavier, but no specific group is contributing outstanding tonnage. Reinforcing bars are quiet, with unseasonably severe weather conditions through the greater part of the country being blamed. Bids will be taken this week on 3000 tons of reinforcing bars for Boulder Dam.

#### Plates and Shapes

The Pennsylvania Railroad has completed allocation of approximately 70,000 tons of plates, shapes, sheets, wheels, axles and other forms of steel required for its car building program. Formal orders will be given this week, and the numerous mills which shared in the business will begin rolling immediately. Shop preparations have been under way for some time, and the cars are expected to be rushed to completion in the early summer. The tonnage was distributed among such a large number of producers that individual allotments were not large. The Pennsylvania has also released 15,000 tons of structural material for electrification towers on its right of way between Wilmington, Del., and Washington. Distribution of steel by the freight car builders who received recent large orders from the Chesapeake & Ohio, the Erie, and the Nickel Plate, has been held up pending the placement of specialties required for these cars by the railroads themselves. Under the circumstances, the heavy plate tonnages required for the program can hardly reach local mills until well along in March. The plate market is otherwise devoid of outstanding developments. Inquiry for structural steel continues active, although new awards are not heavy. A bridge over the Choptank River at Cambridge, Md., will take 4830 tons of structural material, which has been placed with McClintic-Marshall Corp. Demand for sheet steel piling continues fairly active, with additional business promised by lock and dam work on the Ohio and Mississippi Rivers.

#### Tubular Goods

This market shows no particular change, with mechanical tubing and boiler tubes reported to be in relatively good demand. Pipe makers are still taking some tonnage from CWA projects in various parts of the country, principally standard pipe. Oil country goods are moving in steady, if light, volume. Reports that two Valley makers are negotiating for 40,000 tons of line pipe for Russia are partially confirmed, although the deal has not reached a point where its consummation may be predicted with any certainty.

#### Wire Products

When compared with demand for sheets and strip steel, wire shipments are relatively light, although they

show up favorably with those of other finished steel products. Steady improvement has been reported thus far in the month, although incoming tonnage is still far below December levels.

#### Sheets

Improvement in sheet demand is still unabated, and some makers report that each week thus far in the year has shown an improvement over its predecessor. Automotive demand predominates, and with many mills insisting that first quarter specifications be placed before March 1, the current week is expected to be a busy one. Producers are generally beginning to plan their rolling schedules for the remainder of the quarter, and some mills are already booked up for the entire period. Demand from sources other than automotive continues to expand gradually, with no outstanding consuming group. The Pennsylvania Railroad has placed a few thousand tons for freight car roofing, and other railroad business has reached car roofing makers. Production continues at around 55 per cent of capacity, with a 60 per cent average rate predicted before the end of the week.

No important price changes have been filed to become effective on second quarter business, although mills point to the fact that the code has set no precedent regarding advances in the midst of a quarter.

#### Tin Plate

Specifications are holding up fairly well, and recent large releases have enabled producers to maintain production at least 60 per cent of capacity. The leading interest is engaged at better than 70 per cent, with one or two independents at an equally high rate. Practically all of the larger makers are running at 50 per cent or better.

#### Strip Steel

Uncertainty regarding second quarter prices has benefited the market to some extent during the last week, but it now seems definitely settled that no advance will be filed in the immediate future. Under the circumstances, consumers may be anxious to cover for the second quarter at current levels as soon as possible, as the prospect of an advance in March would not be remote. Demand from the automotive industry is well sustained, and production of hot-rolled strip has risen to about 60 per cent of capacity. Cold rolling mills are lagging slightly, although improvement in demand for this product is reported by some makers.

#### Coal and Coke

Continued heavy demand for domestic coke has influenced the market on other grades, with the result that furnace coke is by no means plentiful in the district. By-product plants are disposing of practically all of their surplus in the domestic market, and

the Valley blast furnace, which plans to resume production early next week, has purchased a quantity of beehive material. By-product plants in the Lake Erie district are disposing of their entire output, and have purchased some coke in the outside market to fill urgent demands. The foundry grade is slightly more active, but has not reacted particularly to the recent domestic situation.

#### Scrap

Sale of a fair-sized tonnage of No. 1 heavy melting steel to a Pittsburgh district consumer late last week at \$14.50 has advanced the market another 50c. a ton. Dealers are paying \$14 to cover old \$13.50 orders, and most of them are unwilling to make commitments at the top of the present range. No. 2 steel is also stronger, as the rising price on No. 1 material has developed new buyers for the cheaper grade. Hydraulic compressed sheets are very scarce and, with hardly any Michigan bundles coming into the district, quotations are largely nominal. Specialties continue strong, with local foundries showing more interest in covering their requirements.

### Boston Scrap Prices - Move Upward

**B**OSTON, Feb. 20.—Milder temperatures have resulted in more activity at scrap yards, and the movement of material is more extended, yet by no means active. A barge is loading here with heavy and semi-heavy scrap for eastern Pennsylvania delivery, but the bulk of shipments is for Pittsburgh consumption. Scrap prices tend upward and on some materials average 25c. to 50c. a ton higher than a week ago. However, they apparently have not reached a level attractive to scrap owners, who are still reluctant to let go.

Sales of pig iron the past week were confined to a few hundred tons, mostly for prompt shipment and mixture purposes. There are no open inquiries of size, but indications are a moderate business will be booked prior to March 1, when it is anticipated prices may be higher. It is quite evident that a number of the smaller foundries will require iron in the second quarter, because stocks in their yards are small, and business is picking up although slowly.

The Kalman Steel Corp. has booked an order for 3500 tons of piling, anchor rods, bolts, nuts, turn buckles, etc., the largest order of this kind reported in more than a year, and another order for 700 tons of piling for the Fore River bridge, Quincy, Mass.

The fabricating steel market is dull, but it is expected that approximately 7000 tons will come up for figuring within the next fortnight.

# Marked Gain in Steel Operations in Chicago District



**Ingot Rate Up 6½ Points to 44½ Per Cent of Capacity — Automobile and Farm Implement Orders Still Mainstays**

**C**HICAGO, Feb. 20.—Chicago mills are now getting real benefit from activity at automobile centers and added to these increasing releases are the fast growing needs of agricultural machinery manufacturers. Ingot output has gained 6½ points, now standing at 44½ per cent of capacity. This is the highest rate attained since the middle of last October, and in the spring of 1933 mills did not reach above 40 per cent of capacity until the early part of June.

Both new buying and fresh specifications for finished steel are creeping forward and inquiries give assurance that the trend will continue upward.

## Pig Iron

A drop of 50c. a ton on basic iron at an Eastern producing point has had no effect on the local market and prices for No. 2 foundry iron remain firm at \$17.50 a ton. Agricultural machinery manufacturers are now taking more iron than at any time in well over a year and one half. There is also some attractive business being placed and the Chicago district is getting a larger part of current automobile business. All indications point to February shipments being at least 30 per cent above those of January. All new buying is on a spot basis and the average from week to week is fairly steady. Southern iron still carrying the 38c. differential is moving in larger quantities to the territory immediately surrounding Chicago.

## Cast Iron Pipe

Direct buying of cast iron pipe is small, the bulk of the tonnage moving being on contractors' lists. Chicago has ordered 250 tons against an inquiry for 2500 tons. Lake Forest, Ill., has taken a small tonnage, and Wilmette, Ill., is expected to take action on 900 tons before the week ends. Curtailment of the CWA program is cutting sharply into the number of small pick-up orders that have been in the market during recent months. However, large tonnages are still to be placed for programs sponsored by PWA. Current quotations are firm.

## Reinforcing Bars

Awards exceed 2200 tons but fresh inquiries are almost totally lacking.

Of the tonnage placed almost one-half is for Illinois road and bridge work, while another 500 tons is for a dam across the Mississippi River at Dubuque, Iowa. An underground water storage tank to be constructed by Evanston, Ill., will take 250 tons of reinforcing bars. Use of reinforcing steel for CWA projects is slowing down.

## Warehouse Business

Orders are fairly uniform from week to week and the February average is exceeding the second month of 1933, by at least 5 per cent. Prices are unchanged with the exception of advances on several minor products.

## Wire Products

Output is gaining slowly and has now reached close to 45 per cent of capacity. This gain is influenced by increased shipments, which remain rather spotty, especially in rural districts, because of the variable conditions of the weather at a time when increased activity is to be expected. Dealers report better business but their stocks are large and it may be a number of weeks before they will enter the market for more than minor replacements. The same situation exists as to warehouses. The field for railroad buying is considered potentially large but all signs point to the railroads' first satisfying themselves as to purchases of the heavier products before they enter the wire market in a substantial way. Mill stocks, though not large, are again well balanced after having been depleted during the December rush. Consumption of manufacturers wire is not large except in automobile manufacturing centers where demand is steadily mounting.

## Cold-Finished Bars

Shipments to automobile plants are in substantial volume and parts makers are taking increasingly larger quantities. The use of this commodity by the miscellaneous user remains light.

## Bars

Although miscellaneous consumers are taking some additional bars still it rests with automobile builders to take the bulk of current output. Bar

mill schedules are moderately heavier and according to sellers should make further gains on the basis of increased demand from automobile centers and from farm implement manufacturers.

## Plates

Odd lot orders, though fairly numerous, account for the bulk of business reaching local plate mills, which are in need of tonnage to bring them anywhere near the average production records of other producing units. The railroad equipment market appears to have run dry. The Van Sweringen cars are still tied up in red tape and it may be considerably more than a month before the tonnage reaches mills.

## Sheets

Demand from other than automobile centers is quiet. The Wisconsin seller of steel barns reports that this commodity is fast taking hold and the fabrication plant at Canton, Ohio, is fairly busy. This outlet for steel is decidedly more favorable.

## Structural Material

Awards have not reached above the 4000-ton mark and fresh inquiries stop at 10,000 tons unless there can be counted the 28,000 tons of all kinds of steel needed for seven additional dams across the Mississippi river on which bids have not yet been called. Only two bids were received on the 5000-ton auditorium at Kansas City, Mo. Once before all bids were thrown out because only three bidders appeared and the number was not considered adequate.

## Rails and Track Supplies

A western railroad has tentatively placed 25,000 tons of rails. Formal announcement of this transaction is expected at an early date. The rail buying program as a whole has gained no momentum and the outlook is not bright for the remainder of the month considering that the present price agreement expires March 1. Orders for fastenings are holding the gain recently made. Spring track work is only a few weeks away.

## Scrap

This market continues to drift awaiting the time when mills will need to place additional orders. The one bit of excitement exists among dealers who have old orders to fill and who are having difficulty in getting material. Mill acceptances of heavy melting steel are strictly limited, yet supplies are sufficiently restricted to force dealers to pay from \$10.75 to \$11.25. A significant development is the fact that mills that had not bought since prices were \$2 to \$3 a ton lower than at present are now recognizing present price levels. The Burlington is offering a 2000-ton list, which includes 500 tons of heavy melting.



# Belated Rail Inquiries Appear in New York Area



**New York Central in Market for 38,000 Tons of Rails—Some Roads Ask for Extension of Rail Price—Roads Want Long Haul on Car Material**

**N**EW YORK, Feb. 20.—Demand for finished steel continues on the upgrade and bookings of some local offices thus far this month exceeded the total for any month since 1932. A number of mills are now sold out for the first quarter on cold-finished sheets or tin plate. Prices for the second quarter are still an unknown quantity, with opinion divided on the probability of advances.

The New York Central will ask for bids on 38,000 tons of rails Feb. 28, and the Erie and Baltimore & Ohio lines also expect to take figures on their rail requirements before March 1. Some of the railroads that have not yet succeeded in making arrangements for Government loans have asked the mills to extend the present rail price beyond March 1, and it is probable that this request will be considered by the American Iron and Steel Institute during the current week.

The contracts for equipment placed by the Van Sweringen lines are awaiting approval of the transportation coordinator. It is understood that the car builders, at the request of the railroads, will order the steel in such a manner as to give the purchasing carriers the longest possible haul. Under the code, distant mills will find it necessary to meet delivered prices from the nearest mills and absorb the disadvantage in freight. The so-called railroad resolutions, No. 29 and No. 38, which were passed for the purpose of preventing such a situation from arising in connection with railroad purchases, do not apply to sales to car builders.

Bids on the Midtown tunnel, New York, calling for 1000 tons of reinforcing bars and 4500 tons of structural steel were postponed from Feb. 14 to Feb. 21. New general contract tenders on the Midtown post office, New York, calling for 10,000 tons of structural steel, will also be taken this week.

## Pig Iron

Since there is practically no consumer interest in this market, the attention of the trade is centered in the filing of second quarter prices, which should be completed this week. Practically all local furnace representatives expect prevailing quotations to be reaffirmed for New York and east-

ern Pennsylvania deliveries. Aggregate foundry melt is unchanged in volume from the level established about a month ago, and iron inventories are slowly being liquidated. Surplus yard stocks, however, are still of such size as to preclude a return of active purchasing until foundry schedules are more encouraging. There is no important open inquiry in the market, and selling continues to be confined to car lots. Bookings for the seven-day period totaled slightly more than 1700 tons, as compared with 2000 tons in the preceding week and 2500 tons a fortnight ago.

## Reinforcing Steel

Taking advantage of a new code ruling, local distributors are now asking \$1 a ton delivery charge in the

## Sheet Mills Crowded In Cincinnati District

**C**INCINNATI, Feb. 20.—Heavier demand from electrical refrigerator manufacturers has added to the steady automotive demand, crowding sheet mills virtually to capacity. Stove manufacturers also are becoming active in the market, but their purchases have not yet reached substantial proportions. Rolling schedules on all lines except electrical sheets are at high levels, but the district average is just above 60 per cent.

Pig iron shipments this month have been better than in January, but new business is confined to sales of prompt and March iron. Foundries are withholding heavy ordering until March 1, to permit them to make a better estimate of their business during the next month.

With four to six weeks yet to go on many old scrap contracts, mill interests are delaying new purchases. In some instances consumers' inventories are estimated at four to six months' requirements. Price advances in other districts tend to sustain the local market, but no advances are anticipated.

metropolitan area. Pending bar requirements for highways and large public works are more encouraging, and actual bookings expanded considerably during the past week. Kalman Steel Corp., will furnish 1800 tons of reinforcing for the Choptank River bridge at Cambridge, Md., and 650 tons for a housing development at Philadelphia was split between Taylor-Davis, Inc., and Truscon Steel Co.

## Scrap

Prices on several important grades have advanced, and even the less active grades are much firmer as a result of urgent demands from domestic consumers and the sustained purchasing program against export contracts. Local brokers have not altered the \$9 and \$7.50 prices for No. 1 and No. 2 steel respectively for barge loading, but rail quotations have advanced 50c. a ton as a result of higher selling prices at Pittsburgh and in eastern Pennsylvania. No. 2 cast is being bought in this district at \$7 to \$7.25, and at \$10.50 delivered to Florence, N. J., and the broker's price for desirable rerollers has advanced to \$9.25 for delivery to Japanese users.

The current inclement weather, however, is hindering both export and domestic loadings, and local brokers expect prices on important grades to advance materially during the week as domestic mills bid for available supplies.

## Scrap Advances at Buffalo

**B**UFFALO, Feb. 20.—The entire scrap list has strengthened since the purchase last week by the largest consumer in the district of a tonnage of No. 1 and No. 2 steel and allied grades. From 2500 to 4000 tons was bought. For the No. 1 steel, \$12 was paid; for the No. 2 steel, \$10.50. The same consumer was anxious to buy more, but found that most of the scrap on hand was being held for \$13, which it declined to pay. Stove plate has been sold for \$10.50, and No. 1 machinery cast for \$12.50 and \$13.

Steel output in this district is unchanged, with the Lackawana plant of Bethlehem operating 10 open-hearth, Republic Steel Corp. operating five, and Wickwire-Spencer Corp., one. The Seneca sheet division of Bethlehem remains on an 80 per cent basis.

A Buffalo maker will fabricate 400 tons of steel piling for CWA jobs for the city of Buffalo.

The pig iron market continues quiet, with no price changes scheduled for second quarter. Orders are for small lots, but they are being placed more frequently. Apparently no large inquiries are out.

# Railroad Releases Feature Philadelphia Market



**Pennsylvania Lines Will Also Shortly Close for Its Electric Locomotives—Sheets and Strips Active—Steel Output Rises to 27 Per Cent**

**P**HILADELPHIA, Feb. 20.—The Pennsylvania Railroad having distributed about 72,000 tons of steel for 6500 freight cars is pushing forward with its program of electrification between Wilmington, Del., and Washington. Having released 15,000 tons of structural material, it expects to announce further orders in two or three days to be followed by releases on electric locomotives. Aside from this railroad business, the market remains quiet although especially strong in sheets and strip steel. There are reports that the third quarter prices of these products may be increased though no definite decision appears to have been reached. It is believed that prices of other steel products generally as well as that of pig iron will not be changed.

Public works business continues to reflect only a light inflow to mills. It is believed, however, that as funds for these projects now are being drawn in greater volume from the Treasury by borrowers they will soon provide a marked impetus in rolling schedules. The trade is engaging in considerable discussion as to what may be expected to follow after Government-financed business has been wound up. It is the hope that private capital will become much more aggressive and enter into commerce to stimulate and supplement Government-financed activity.

Open-hearth operations have increased one point to 27 per cent of capacity.

## Pig Iron

Melt at job foundries has increased considerably with a resultant though not large gain in orders for pig iron. Shipments of iron also are moving forward on a fair scale. Some foundries are doing considerable estimating work and should the business develop it will reflect itself in good-sized orders for blast furnace operators. The general view appears to be that third quarter prices will be unchanged from current levels.

## Plates, Shapes and Bars

Going ahead with its program of electrification between Wilmington, Del., and Washington, the Pennsylvania is preparing to make a series of steel releases in quick order, to follow releases of 15,000 tons announced last

week. In a day or so, it expects to release some important tonnages and soon after will give release orders on requirements for 14 electric switch locomotives, to be followed by others until the entire 101 electric locomotives to be built are covered. Some of these will come from private shops and others from the Pennsylvania's own shops. The second list of releases will cover freight engines, while subsequent releases will be for passenger locomotives. Releases last week for 15,000 tons of steel, representing an outlay of \$1,000,000, were for poles and overhead support for the catenary wire system. About 5000 tons of poles went to the McClintic-Marshall Corp. Others sharing in the business were the American Bridge Co., the Fort Pitt Bridge Co., the Ingalls Iron Works and the Shoemaker Bridge Works.

Distribution of 72,000 tons of steel for 6500 freight cars was made among 21 companies out of 27 which submitted bids. The outlay was \$3,600,000. Steel was placed over a wide area on the carrier's lines, from eastern Pennsylvania and other nearby mills to producers in western Pennsylvania, eastern Ohio and West Virginia. The breakdown of the tonnage and distribution by companies was not made known. It is reported that No. 10 gage hot-rolled sheets and sheared plates made up about one-half the tonnage and apparently the bulk of these requirements went to Pittsburgh, eastern Ohio and West Virginia mills, though mills in this district shared in the allotments. To a greater extent they participated in tonnage for center sills, axles and wheels, though good-sized requirements of these products are understood to have gone to a Pittsburgh maker. It is expected that releases on the entire tonnage will be given at an early date.

## Sheets

Only moderate-sized tonnages of sheets for the 6500 freight car program for the Pennsylvania Railroad are said to have gone to mills in this district. Good-sized orders for cold-rolled sheets have been placed the past week by an automobile body builder in this district and another local automobile body builder has placed fair-sized requirements. Mills

on finished grades are running at capacity, while business for commercial sizes is light. The greatest demand is for wide sheets with some mills unable to take additional bookings for first quarter shipment. An early upturn in buying by stove makers is expected, as is also demand from radio manufacturers. It is said consideration is being given to increase prices on sheets and strip for the third quarter.

## Wire

The Pennsylvania Railroad distributed 1,000,000 lb. of bare copper wire and cable in connection with its 6500-car building program. Distribution of the business was made among the following producers: John A. Roebling's Sons Co., General Cable Corp., Phelps-Dodge Copper Products Corp., Anaconda Wire & Cable Co., and Ansonia Copper Co.

## Imports

The following iron and steel imports were received here last week: 647 tons of pig iron from British India; 100 tons of ferromanganese from Poland; 38 tons of steel tubes, 12 tons of steel forgings and 9 tons of steel bars from Sweden; 1 ton of tungsten metal from Germany, and one-tenth of a ton of manganese metal from France.

## Warehouse Business

Jobbers report a slight recession in demand. Prices remain unchanged.

## Scrap

The market is quiet but maintains its strength, partly supported by the export movement.

## Southern Market Remains Quiet

**B**IRMINGHAM, Feb. 20.—There has been no change lately in the sluggish condition of the pig iron and steel markets. The general business situation in this section is also quiet, with activity dependent largely on Government expenditures, such as CWA, PWA, road building, army construction, etc. The heavy stocks of pig iron and steel accumulated by consumers in December will likely affect demand for some weeks more. Pig iron buying is almost entirely on a spot basis, with orders generally small. Blast furnace operations have not changed in the past three weeks, with ten stacks active. The price remains at \$13.50.

Steel buying is made up of small lots, with aggregate tonnage rather small. Several orders were received last week for track materials, but these likewise were not large. Eleven open-hearths were worked last week, as compared with 12 for a month or so previously. The schedule this week will likely go back to 12.



# Operations Rise Two Points To 65 Per Cent at Cleveland



**Orders for Finished Steel Increase in Number and Size—VanSweringen Car and Engine Business Expected by Week-End**

**C**LEVELAND, Feb. 20.—Orders for finished steel from miscellaneous sources have increased in number and size. Sheets and strip steel are still the most active products. The automotive industry is issuing heavy specifications for these against recently placed contracts, in some cases urging quick shipment and in others getting orders in early to make sure of shipments before the end of March. While some of the mills have about all the sheet tonnage on their books that they can ship before the end of the quarter, others still have tonnage available. Some of the sheet mills are willing to take second-quarter contracts subject to whatever prices prevail for that delivery but no business has as yet been booked on that basis.

Ingot output in the Cleveland-Lorain territory increased two points this week to 65 per cent of capacity. Two open-hearth furnaces in Lorain were put on and one in Cleveland was taken off for repairs but is scheduled to resume later in the week.

The placing of steel and specialties for the Van Sweringen railroad cars and the locomotives is awaiting the formal approval of the PWA loan by the Interstate Commerce Commission. It is expected that this approval will be forthcoming in time to permit the signing of contracts for the equipment this week and that the steel orders for the cars will reach the mills not later than next week. The Erie Railroad has issued its long pending inquiry for 30,000 tons of rails. Cleveland and Youngstown mills shared in some of the car tonnage placed by the Pennsylvania Railroad and a Cleveland foundry took an order for 250 car trucks.

Lake furnace prices on pig iron appear to be definitely re-established for the second quarter and producers have not talked of or filed new prices. There is as yet no announcement on sheet and strip prices for the quarter. An advance on strip is now regarded as quite doubtful.

## Pig Iron

Present Lake furnace prices are expected to continue through the second quarter. Books for that delivery will be open March 1. The code requires, in case of an advance, the filing of new prices Feb. 19 to become

effective on March 1. The improvement in the demand for pig iron is less than the gain in steel tonnage and some producers feel that a price advance is not justified at present, although production costs will increase April 1 for those furnaces having low price pre-code coal contracts which expire the end of the present quarter. The automotive industry continues to take good shipments but the demand from most other industries shows only slight improvement. There is not much new buying. A leading interest sold 3000 tons during the week.

## Sheets

Specifications in heavy volume came from the automotive industry during the week following the round lot buying by that industry for the remainder of the quarter. More mills have become virtually sold up for the quarter, particularly on cold finished sheets, and some sales offices are declining to take additional orders until they can ascertain whether the mills can produce the sheets in time for shipment by March 31. The Newton Steel Co. resumed operations in its Newton Falls plant Feb. 19, starting 10 out of 20 hot mills.

## Strip Steel

Heavy specifications are coming from the automotive industry, some companies ordering all the material they expect to use for the remainder of the quarter. Mill capacity is not yet taxed for the remainder of the quarter as in the case of sheets. Mills which have been selling hot rolled strip to automobile plants in Indiana on a Pittsburgh base will have to meet Chicago district competition with the recent \$1 a ton reduction in Chicago. By quoting a Chicago base they will suffer to the extent of 60c. a ton as compared with the Pittsburgh base on material for shipment to a large consuming center in Indiana.

## Iron Ore

Consumption of Lake Superior ore in January amounted to 1,656,303 tons, an increase of 58,623 tons over December, and comparing with 661,116 tons in January last year. Furnace stocks Feb. 1 were 27,726,872 tons and stocks at furnaces and docks were 32,973,150 tons as against 30,812,119 tons on the same date a year ago. There were 73 furnaces using

Lake ore in blast Jan. 31, a gain of nine for the month. Central district furnaces in January consumed 878,164 tons, a gain of 7707 tons. Lake front furnaces used 767,025 tons, a gain of 50,547 tons. Eastern furnaces used 5591 tons, an increase of 707 tons and all rail furnaces melted 5523 tons, a loss of 338 tons.

## Rails and Track Accessories

The Erie Railroad has sent out its inquiry for 30,000 tons of rails, the tonnage that was announced several weeks ago that this company would purchase for 1934. The present price of \$36.37½ on rails, which the rail mills agreed upon several months ago, will expire March 1, unless an extension is allowed. It seems uncertain at present whether the steel companies will be willing to extend the time for placing rail orders at this price. The Chesapeake & Ohio has an inquiry out for 500 tons of screw spikes and some of the other roads in this territory have issued preliminary inquiries for unstated tonnages of spikes.

## Bars, Plates and Shapes

Miscellaneous demand for steel bars has improved. A Cleveland mill has participated in the plate tonnage for cars placed by the Pennsylvania Railroad. Activity in the structural field is still quite restricted. Reinforcing bars are in fair demand for highway work and more small lots for private work are coming out than for some time.

## Scrap

A Valley district mill made a purchase of heavy melting steel during the week, paying \$13.75 for No. 1 scrap, and dealers are paying \$13.25 to cover against this tonnage. Locally the market is very firm but there has been no new buying by Cleveland plants, one of which because of congestion has held up shipments of steel making scrap.

## St. Louis Road Fails to Place Contingent Orders

**S**T. LOUIS, Feb. 20.—Mills have rejected the proposal of a railroad centering here to accept signed contracts for rails contingent on obtaining loans from the Reconstruction Finance Corp., the mills insisting that if the contract is signed it obligates the railroad to purchase the material whether the loan is granted or not.

A joint low bid has been made on the general contract for the Municipal Auditorium, Kansas City, requiring 4800 tons of structural steel, by S. Patti Construction Co. of Kansas City, Fleischer Engineering & Construction Co. of St. Paul, and Ring Construction Co. of Minneapolis. The State of Illinois opened bids on Feb.

13, for highway projects requiring 3700 tons of structural steel and 300 tons of reinforcing bars. The Omaha Bridge Commission will open bids on Mar. 5 for a bridge across the Missouri River requiring 3875 tons of structural steel.

A pick-up in inquiries is reported, notably for sheets for the automobile industry and other lines, such as the stove and jobbing trades, who sense a possible shortage in view of the increased demand from the first-named industry.

Although there has been no heavy buying of pig iron, there has been a slight pick-up in orders and more interest is being evinced in future commitments, encouraging makers to believe that melters are preparing to come into the market.

The Commonwealth division of the General Steel Castings Co. has purchased a round tonnage of heavy melting scrap, in addition to the 5000 tons referred to in THE IRON AGE of last week. Very little scrap is being offered, and dealers seemingly are inclined to hold their stocks for higher prices. No. 1 heavy melting steel and No. 2 railroad wrought are 25c. a ton higher, and railroad springs, steel car axles and cast iron carwheels are 50c. a ton up.

## E. F. Houghton & Co. Reelects Officers

AT the annual meeting of stockholders of E. F. Houghton & Co., Philadelphia, manufacturers of oils and mechanical leather goods, the following officers were reelected:

President, Louis E. Murphy; First vice-president and general manager, Maj. Aaron E. Carpenter; second vice-president and director of sales, George W. Pressell; secretary, A. E. Carpenter, III; treasurer, Dr. R. H. Patch.

The company resumed payment of its customary service bonus to employees for 1933. The treasurer reported that the regular dividends on preferred stock and a small dividend on common stock had been paid during 1933, thus maintaining an unbroken dividend record on preferred stock since 1910 and on common stock since 1923.

## Pipe Lines

American Gas Construction Co., Rand Tower Building, Minneapolis, plans early surveys for welded steel pipe line from Montana natural gas fields to Minneapolis and vicinity. Cost over \$10,000,000 with storage and distributing stations and facilities at different points. Charles I. Tenney is president.

Coral Gables & Suburban Gas Co., Coral Gables, Miami, Fla., plans about 30-mile steel pipe line for gas distribution in Coral Gables district. A 30-year franchise has been asked, including new artificial gas plant. Cost about \$450,000. Charles E. Starr is president.

Beasley Gas Co., McAlester, Okla., care of J. L. Fuller, McAlester, representative, plans main steel pipe line and distributing lines at

Tahlequah, Okla., and vicinity, for natural gas. Cost about \$200,000. Financing is being arranged.

McClintic-Marshall Co., Pittsburgh, has submitted low bid to United States Engineer Office, Kansas City, Mo., for 1560 pieces of 28-in. flanged steel pipe, at \$194,640, f.o.b. Chicago.

Hesston, Kan., plans steel pipe line for gas distribution. Federal financing will be arranged. F. E. Devlin, E. K. H. Building, Wichita, Kan., is consulting engineer.

Coltco Corp., Monroe, La., has placed an order with Naylor Pipe Co., Chicago, for about 17 miles of 16-in. O.D. Naylor spiral-weld toncan iron pipe, Victaulic coupled, for a gas line in the Texas Panhandle district.

## Corporation Sets Up Railroad Bureau

THE subsidiary manufacturing companies of the United States Steel Corp. have organized and established a railroad research bureau to engage in developmental work for the benefit of the railroad industry and its sup-

pliers. John A. Ralston is manager of the bureau, which now has its headquarters in the Frick Building Annex, Pittsburgh. Engineering and experimental work of this department will be closely coordinated with the activities of the subsidiary manufacturing companies, in the interest of rendering service to all who are concerned with the advantageous application of rolled steel products to the construction of railroad equipment.

A series of high-tensile steels are being produced and offered to the trade by the companies cooperating in and with the railroad research bureau. Grades and products suitable for a variety of requirements are available for the execution of new designs, which have as their purpose a reduction in weight without attendant sacrifice of strength. Consultation with the bureau or the respective subsidiary companies is invited.

Works Mgr.: "Say, Mister Purchasing Agent, thanks for that suggestion you made! We've just had Carboloy cemented carbide demonstrated on those new machine tools we've considered purchasing. We found that they make a great cost-saving team----- and there'll be no guesswork about the future use of Carboloy tools on these new machines."



It will pay you to investigate the cost-saving possibilities of Carboloy cemented carbide on those new machine tools you're considering purchasing. Demonstrations gladly arranged without obligation.

# CARBOLLOY COMPANY INC

Manufacturers of all types of cemented carbides made

2495 E. Grand Blvd., Detroit, Michigan

SALES AND SERVICE

CHICAGO — CLEVELAND — DETROIT — NEWARK — PHILADELPHIA — PITTSBURGH

(No. 2 of a series published in the interests of both machine tools sellers and buyers.)



# Non-Ferrous Metals Prices Hold Steady Although Consumer Demands Are Light

Tin Plate Interests Purchase Moderate Tonnages at Prices Near 52c.—Lead Trading in Fair Volume—Zinc Quiet

**N**EW YORK, Feb. 20.—The electrolytic copper market continues to mark time, with all custom interests willing to sell metal into June at 8c. a lb., delivered Connecticut valley points. Mine producers continue to refrain from open market transactions, and they are still nominally holding offerings at a 9c. level. Current inquiry has been very light, and bookings made during the week were almost negligible. Since the new copper code contains no selling restrictions, the market is only nominally interested in its acceptance. Most members of the trade recognize the futility of settling all the ills of the industry by codification, and, therefore, are in sympathy with the transference of attention to wages and employment restrictions. Labor leaders will probably find fault with several provisions when the hearing opens on Feb. 27, but a quick settlement is expected by most observers.

Apparent American copper consumption during January was about 6000 tons greater than December consumption, and stocks declined almost 4000 tons. The decline, however, had little effect on the large surplus of unwanted metal hanging over the consuming market. This stock surplus may even show an increase in the near future if mining operations are increased in order to secure the benefits of the present high prices for by-product gold and silver.

Daily export sales have been in substantial volume at equivalent cent prices ranging from 8.15c. to 8.20c. a lb., c.i.f. Continental base ports. Prices abroad are somewhat uncertain, and fluctuations are principally governed by changes in sentiment here.

## Tin

Following a protracted period of inactivity, importers are welcoming the return of buying interest on the part

of tin plate mills. Current trading is mostly for spot, but positions into April are available at prices which range around 52c. a lb., New York. London quotations are higher on the strength of fair consumer and professional demands and the improved position here. Firmer bids for nearby dates resulted in a backwardation of 5s., with spot standard priced at £226 10s. on first call today. Straits at Singapore closed the day 5s. higher at £229 5s.

## Zinc

Spelter quotations have failed to rise with the firming of concentrates at \$30 a ton, and prompt and first quarter metal is currently procurable in good quantities at 4.40c. a lb., East St. Louis, and 4.75c., New York. Most sellers, however, are very reluctant to book second-quarter supplies unless premiums are offered. Sales during the past seven-day period aggregated about 2000 tons, as compared with 4600 tons in the preceding period, and 5000 tons sold a fortnight ago. The much improved consumer interest is encouraging the trade considerably, but attention is particularly centered in developments in the Tri-State district as to their possible reflection in the Prime Western market. Mining interests appear to have the ore market well in hand, but, in view of past difficulties, it is doubtful whether there will be strict adherence to output and selling restrictions. The Joplin output of 6850 tons last week represented practically full mining operations. Shipments totaled 6350 tons, and stocks thereby increased about 500 tons to 17,150 tons. It is expected that production will decline considerably this week if planned curtailments are effective, but the action will probably have little effect on the large stock surplus.

## Lead

Trading during the past week was not marked by conspicuous activity, but the market was at all times considered satisfactory with moderate daily buying in evidence. Although the statistical position is expected to be again unfavorable at the end of February, the present steady consumer demands are ample justification for the firm price basis of 4c. a lb., New York, and 3.90c., St. Louis. Cable makers are still not greatly interested in metal, but all other consuming outlets are well represented in the current activity. About 3000 tons of metal for February delivery remains to be booked, and sellers anticipate additional March commitments to aggregate over 14,000 tons. Potential demands, therefore, are encouraging, and there is apparently no likelihood of price weakness.

A price of 1.70c. a lb., Chicago, for hot-rolled strip made from rail steel will be effective March 1, according to the American Iron and Steel Institute.

The Week's Prices. Cents Per Pound for Early Delivery

	Feb. 14	Feb. 15	Feb. 16	Feb. 17	Feb. 19	Feb. 20
Electrolytic copper, N. Y.*	7.75	7.75	7.75	7.75	7.75	7.75
Lake copper, N. Y.	8.00	8.00	8.00	8.00	8.00	8.00
Straits tin, Spot, N. Y.	51.65	51.80	52.25	52.25	52.62½	52.00
Zinc, East St. Louis.	4.40	4.40	4.40	4.40	4.40	4.40
Zinc, New York.	4.75	4.75	4.75	4.75	4.75	4.75
Lead, St. Louis.	3.90	3.90	3.90	3.90	3.90	3.90
Lead, New York.	4.00	4.00	4.00	4.00	4.00	4.00

\*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98-99 per cent, 22.90c. a lb., delivered; new No. 12, 20.00c. a lb., delivered. Aluminum, remelt No. 12 (alloy), carload lots delivered, 15.50c. a lb., average for week. Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered. Antimony, 7.15c. a lb., New York. Brass ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

### From New York Warehouse

#### Delivered Prices, Base per Lb.

Tin, Straits pig.	53.00c. to 54.00c.
Tin, bar.	55.00c. to 56.00c.
Copper, Lake.	9.75c. to 10.50c.
Copper, electrolytic.	9.50c. to 10.00c.
Copper, castings.	9.25c. to 10.25c.
*Copper sheets, hot-rolled.	15.00c.
*High brass sheets.	13.75c.
*Seamless brass tubes.	16.25c.
*Seamless copper tubes.	16.25c.
*Brass rods.	12.25c.
Zinc slabs.	5.75c. to 6.75c.
Zinc sheets (No. 9), casks.	9.75c. to 10.00c.
Lead, American pig.	4.75c. to 5.75c.
Lead, bar.	5.75c. to 6.75c.
Lead, sheets.	7.75c.
Antimony, Asiatic.	8.75c.
Alum., virgin, 99 per cent, plus.	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent.	18.00c. to 19.00c.
Solder, ½ and ½.	32.00c. to 33.00c.
Babbitt metal, commercial grade.	25.00c. to 60.00c.

\*These prices are also for delivery from Chicago and Cleveland warehouses.

### From Cleveland Warehouse

#### Delivered Prices per Lb.

Tin, Straits pig.	56.50c.
Tin, bar.	58.50c.

Copper, Lake.	9.00c.
Copper, electrolytic.	9.00c.
Copper, castings.	8.75c.
Zinc, slab.	5.75c. to 6.00c.
Lead, American pig.	5.00c. to 5.25c.
Lead, bar.	8.00c.
Antimony, Asiatic.	9.00c.
Babbitt metal, medium grade.	19.50c.
Babbitt metal, high grade.	62.00c.
Solder, ½ and ½.	33.75c.

### Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hv. crucible.	6.50c.	7.25c.
Copper, hv. and wire.	6.25c.	7.00c.
Copper, light and bottoms.	5.25c.	6.25c.
Brass, heavy.	3.50c.	4.25c.
Brass, light.	3.00c.	3.625c.
Hvy. machine composition.	4.75c.	5.625c.
No. 1 yel. brass turnings.	4.25c.	5.125c.
No. 1 red brass or compos. turnings.	4.25c.	5.25c.
Lead, heavy.	3.00c.	3.625c.
Zinc.	2.50c.	3.125c.
Cast aluminum.	9.50c.	11.25c.
Sheet aluminum.	12.25c.	13.50c.

## Reinforcing Steel

Awards 7200 Tons—New Projects  
5475 Tons

### AWARDS

Quincy, Mass., 550 tons, Fore River bridge substructure to Kalman Steel Corp.

Cambridge, Md., 1800 tons, bars and piling for State bridge across Choptank River, to Kalman Steel Corp.; Frederick Snare Corp., general contractor.

Butler County, Pa., 500 tons, mesh for highway, to American Steel & Wire Co.

Middlesex County, N. J., 140 tons, highway, to Concrete Steel Co.

Philadelphia, 650 tons, housing development for hosiery workers, divided between Taylor-Davis, Inc., and Truscon Steel Co.

Cleveland, 140 tons, Brook Park culvert, to Truscon Steel Co.

Guttenberg, Iowa, 575 tons, to Kalman Steel Corp.

Dubuque, Iowa, 500 tons, dam across Mississippi River, to Kalman Steel Corp.

Chicago, 700 tons, Sanitary District sewer project, to Illinois Steel Co.

Oaklawn, Ill., 725 tons, highway bridge, to Olney J. Dean & Co.

State of Illinois, 300 tons, road work, to Calumet Steel Co.

Denver, 180 tons, material for Owyhee project, to Pacific Coast Steel Corp.

Boulder Dam, 215 tons, to Inland Steel Co.

Seattle, 100 tons, warehouse, to Pacific Coast Steel Corp.

State of Oregon, 130 tons, highway in two counties, to unnamed bidders.

### NEW REINFORCING BAR PROJECTS

Quincy, Mass., 380 tons, Fore River bridge deck.

Cleveland, 150 tons, Strongsville and Bedford bridges.

Lawrenceburg, Ind., 400 tons, liquor warehouse, J. & E. Warm Co., Cincinnati, general contractor.

Nogales, Ariz., 1000 tons, flood control conduit.

Boulder Dam, 175 tons; bids under advisement.

Boulder Dam, 3000 tons, Invitation No. 23,095-A; bids Feb. 23.

State of Montana, 170 tons, highway work in two counties; bids Feb. 24.

Honolulu, 200 tons, officers' quarters at Army Base; E. E. Black low bidder on general contract.

## Railroad Equipment

Delaware, Lackawanna & Western has secured funds for repair of 986 box cars and 20 locomotives, and the purchase of 50 hopper cars, 20 steam locomotives and five oil locomotives.

Erie is inquiring for eight combination cars.

New York, New Haven & Hartford is inquiring for one streamline train.

Union Pacific has ordered one six-car and two nine-car aluminum articulated passenger trains from Pullman Car & Mfg. Corp.

Western Maryland is considering bids on 25 steel cabooses.

Wabash Railway receivers have been authorized to retire and dismantle 54 freight cars, one passenger car, 17 locomotives and 26 units of work equipment. Value of the salvage is estimated at \$17,502 and cost of labor in dismantling the equipment at \$4,462.

# BUNDYWELD STEEL TUBING *for* OIL · GAS AND HYDRAULIC BRAKE LINES

Bundyweld Steel Tubing combines the strength of steel with corrosion resisting properties, and sufficient ductility to permit easy fabrication. Its ability to withstand vibration and its great strength and recuperative properties make it superior for most installations. These have been proven both in the laboratory and in actual use. Today 75% of all gas, oil, brake, and vacuum lines are Bundyweld Steel Tubing!

It is rolled from strip steel, (previously copper coated on two sides) then Copper-Hydrogen-Electric-Welded into a solid structure. The reducing atmosphere in the welding process leaves the tube absolutely clean and free from scale. It may be heat-treated without injury.

Both I. D. and O. D. are held to tolerances of .003". Uniformity of wall thickness is an outstanding feature. Furnished in base sizes of  $\frac{3}{16}$ ",  $\frac{1}{4}$ ",  $\frac{5}{16}$ ",  $\frac{3}{8}$ ",  $\frac{7}{16}$ ",  $\frac{1}{2}$ ", and  $\frac{5}{8}$ " in various wall thicknesses, it can be redrawn to any odd size required. Send blueprints or samples for quotations. Complete information upon request.

# BUNDY TUBING CO. DETROIT



# Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

## BARS, PLATES, SHAPES

Iron and Steel Bars	
Soft Steel	
Base per Lb.	
F.o.b. Pittsburgh mill	1.75c
F.o.b. Chicago	1.80c
F.o.b. Philadelphia	2.04c
Del'd New York	2.08c
F.o.b. Cleveland	1.80c
Del'd Detroit	1.90c
F.o.b. Buffalo	1.85c
F.o.b. Birmingham	1.90c
F.o.b. cars dock Pacific ports	2.30c
F.o.b. cars dock Gulf ports	2.15c

## Rail Steel

(For merchant trade)	
Base per Lb.	
F.o.b. Cleveland	1.70c
F.o.b. Chicago	1.70c
F.o.b. Gary	1.70c
F.o.b. Pittsburgh	1.65c
F.o.b. Buffalo	1.75c
F.o.b. Birmingham	1.80c

## Billet Steel Reinforcing

(Cut lengths as quoted by distributors)	
Base per Lb.	
F.o.b. P'gh mills	1.90c
F.o.b. Birmingham	1.95c
F.o.b. Buffalo	1.95c
F.o.b. Cleveland	1.95c
Del'd Detroit	2.05c
F.o.b. Youngstown	1.95c
F.o.b. cars dock Pacific ports	2.45c
F.o.b. cars dock Gulf ports	2.30c
F.o.b. Chicago	1.95c

## Rail Steel Reinforcing

(Cut lengths as quoted by distributors)	
Base per Lb.	
F.o.b. Pittsburgh	1.75c
F.o.b. Cleveland	1.80c
F.o.b. Chicago	1.80c

## Iron

Common iron, f.o.b. Terre Haute, Ind.	1.60c to 1.75c
Refined iron, f.o.b. P'gh mills	2.75c
Common iron, del'd Philadelphia	1.80c
Common iron, del'd New York	1.93c

## Steel Car Axles

F.o.b. Pittsburgh	2.50c
F.o.b. Chicago	2.50c

## Tank Plates

Base per Lb.	
F.o.b. Pittsburgh mill	1.70c
F.o.b. Chicago	1.75c
F.o.b. Gary	1.75c
F.o.b. Birmingham	1.85c
Del'd Cleveland	1.85c
Del'd Philadelphia	1.85c
F.o.b. Coatesville	1.80c
F.o.b. Sparrows Point	1.80c
Del'd New York	1.98c
F.o.b. cars dock Pacific ports	2.25c
F.o.b. cars dock Gulf ports	2.10c
Wrought iron plates, f.o.b. P'gh	3.00c

## Floor Plates

F.o.b. Pittsburgh	3.20c
F.o.b. Chicago	3.25c

## Structural Shapes

Base per Lb.	
F.o.b. Pittsburgh mill	1.70c
F.o.b. Chicago	1.75c
F.o.b. Birmingham	1.85c
F.o.b. Buffalo	1.80c
F.o.b. Bethlehem	1.80c
Del'd Cleveland	1.85c
Del'd Philadelphia	1.90c
Del'd New York	1.95c
F.o.b. cars dock, Gulf ports	2.10c
F.o.b. cars dock Pacific ports (standard)	2.25c
F.o.b. cars dock Pacific ports (wide flange)	2.35c

## Steel Sheet Piling

Base per Lb.	
F.o.b. Pittsburgh	2.00c
F.o.b. Chicago mill	2.10c
F.o.b. Buffalo	2.10c
F.o.b. cars dock Gulf ports	2.45c
F.o.b. cars dock Pacific ports	2.45c

## Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.	
Open-hearth grade, base, 2.45c, a lb. except at Bethlehem where the price is 2.55c.	
Delivered price at Detroit is 2.60c.	

S.A.E. Alloy	
Series	
Numbers	
2000 (1% Nickel)	1.50
2100 (2% Nickel)	1.55
2300 (3% Nickel)	1.60
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is 1/4c. per

lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

## Cold Finished Bars\*

Base per Lb.	
Bars, f.o.b. Pittsburgh mill	2.10c
Bars, f.o.b. Chicago	2.15c
Bars, Cleveland	2.15c
Bars, Buffalo	2.20c
Bars, Detroit	2.30c
Bars, eastern Michigan	2.35c
Shafting, ground, f.o.b. mill	
1 1/2 in. 3.40c	
1-9/16 to 1 1/2 in. 2.90c	
1-15/16 to 2 1/2 in. 2.75c	
2-15/16 to 6 in. 2.45c	

\* In quantities of 10,000 to 10,000 lb.

## SHEETS, STRIP, TIN PLATE

### TERNE PLATE

Hot Rolled	
Base per Lb.	
No. 10, f.o.b. Pittsburgh	1.75c
No. 10, f.o.b. Gary	1.85c
No. 10, del'd Detroit	1.95c
No. 10, del'd Phila.	2.05c
No. 10, f.o.b. Birmingham	1.90c
No. 10, f.o.b. cars dock Pacific ports	2.42 1/2c

### Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.25c
No. 24, f.o.b. Gary	2.35c
No. 24, del'd Detroit	2.45c
No. 24, del'd Phila.	2.55c
No. 24, f.o.b. Birmingham	2.40c
No. 24, f.o.b. cars dock Pacific ports	2.95c
No. 24, wrought iron, Pittsburgh	4.30c

### Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.30c
No. 10 gage, f.o.b. Gary	2.40c
No. 10 gage, del'd Detroit	2.50c
No. 10 gage, del'd Phila.	2.55c
No. 10 gage, f.o.b. cars dock Pacific ports	3.00c

### Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.75c
No. 20 gage, f.o.b. Gary	2.85c
No. 20 gage, del'd Detroit	2.95c
No. 20 gage, del'd Phila.	3.04c
No. 20 gage, f.o.b. cars dock Pacific ports	3.45c

### Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.85c
No. 24, f.o.b. Gary	2.95c
No. 24, del'd Phila.	3.14c
No. 24, f.o.b. Birmingham	3.00c
No. 24, f.o.b. cars dock Pacific ports	3.55c
No. 24, wrought iron, Pittsburgh	4.95c

### Long Ternes

No. 24, unassorted 8-lb. coating	3.25c
----------------------------------	-------

### Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	2.90c
---------------------------	-------

### Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.65c
No. 28, Gary	2.75c

### Tin Plate

Base per Box	
Standard cokes, f.o.b. P'gh district mill	\$5.25
Standard cokes, f.o.b. cars dock Pacific ports	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

### Terne Plate

(Per Package, 20 x 28 in.)	
8-lb. coating I.C.	\$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

### Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.

Base per Lb.	
All widths up to 24 in., P'gh	1.75c
All widths up to 24 in., Chicago	1.80c
All widths up to 24 in., del'd Detroit	1.95c
Cooperage stock, Pittsburgh	1.85c
Cooperage stock, Chicago	1.90c

### Cold-Rolled Strips

F.o.b. Pittsburgh	2.40c
F.o.b. Cleveland	2.40c
Del'd Chicago	2.68c
F.o.b. Worcester	2.60c

### Fender Stock

No. 20, Pittsburgh or Cleveland	3.10c
---------------------------------	-------

## WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

### To Manufacturing Trade

Per Lb.	
Bright wire	2.20c
Spring wire	3.20c

### To Jobbing Trade

Extras of 10c. a 100 lb. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. An allowance of \$2 a ton is made for jobbers on straight, mixed or joint carloads. A 10c. allowance is allowed on less-than-carload shipments.

## STEEL AND WROUGHT PIPE

### AND TUBING

#### Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

#### Butt Weld

Smooth galvanized wire .....	2.7
Polished staples .....	3.0
Galvanized staples .....	3.3
Barbed wire, galvanized .....	2.8

### Wire Rods (Common soft, base)

	Per Gross Ton
Pittsburgh	\$36.00
Cleveland	36.00
Chicago	37.00
Birmingham	39.00
Youngstown (del'd)	37.00

### ALLOY STEEL BLOOMS, BILLETS AND SLABS

F.o.b. Pittsburgh, Chicago, Buffalo, Massillon, Canton or Bethlehem. Base price, \$49 a gross ton except at Bethlehem, where it is \$51. Price del'd Detroit is \$52.

### CARBON STEEL FORGING INGOTS

F.o.b. Pittsburgh, Youngstown or Chicago. Uncropped, \$28 per gross ton.

### COKE, COAL AND FUEL OIL

Coke	Per Net Ton
Furnace, f.o.b. Connellsville	\$3.50
Prompt	
Foundry, f.o.b. Connellsville	\$4.35 to 5.25
Prompt	
Foundry, by-product, Chicago	2.40
ovens, for delivery outside	2.40
switching district	2.40
Foundry, by-product, delivered	1.90
in Chicago switching	3.55
district	
Foundry, by-product, New	
England, delivered	10.50
Foundry, by-product, Newark	
or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleve-	
land delivered	9.27
Foundry, Birmingham	4.75
Foundry, by-product, St.	
Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd	
St. Louis	9.00

Coal	Per Net Ton
Mine run steam coal, f.o.b.	
W. Pa. mines	\$1.55 to \$1.80
Mine run coking coal f.o.b.	
W. Pa. mines	1.80 to 2.00
Gas coal, 1/2-in. f.o.b. Pa.	
mines	2.00 to 2.30
Mine run gas coal, f.o.b. Pa.	
mines	1.80 to 2.20
Steam slack, f.o.b. W. Pa.	
mines	1.30 to 1.40
Gas slack, f.o.b. W. Pa.	
mines	1.65 to 1.85

Fuel Oil	Per Gal. f.o.b. Bayonne, N. J.
No. 2 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. f.o.b. Baltimore	Per Gal. del'd Chicago
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago	
No. 3 industrial fuel oil.....	3.73c.
No. 5 industrial fuel oil.....	3.00c.

### REFRACTORIES

Fire Clay Brick	Per 1000 f.o.b. Works
High-heat Intermediate	
Duty Brick	Duty Brick
Pennsylvania	\$45.00
Maryland	45.00
New Jersey	55.00
Ohio	45.00
Kentucky	45.00
Missouri	45.00
Illinois	45.00
Ground fire clay, per	
ton	7.00

Chrome Brick	Per Net Ton
Standard size	\$45.00

Silica Brick	Per 1000 f.o.b. Works
Pennsylvania	\$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick	Per Net Ton
Standard sizes, burned, f.o.b. Balti-	
more and Chester, Pa.	\$65.00
Unburned, f.o.b. Baltimore	55.00
Grain magnesite, f.o.b. Baltimore	
and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

### CAST IRON PIPE

Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Unburned, f.o.b. Baltimore.....	55.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa. ....	40.00
Domestic, f.o.b. Chewelah, Wash..	22.00

Class "A" and gas pipe, \$3 extra.

# Pig Iron, Ores, Ferroalloys

## PIG IRON

### PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	\$18.50	\$19.00	\$13.00	\$19.50
Bethlehem, Pa.	18.50	19.00	18.00	19.50
Birdsboro, Pa.	18.50	19.00	18.00	19.50
Swedeland, Pa.	18.50	19.00	18.00	19.50
Sparrows Point, Md.	18.50	18.00	17.50	18.00
Neville Island, Pa.	18.00	17.50	17.00	18.00
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown	17.50	18.00	16.50	18.50
Buffalo	17.50	18.00	17.00	18.50
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, Ohio	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
Hamilton, Ohio	17.50	17.50	17.00	18.00
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	18.50
Duluth, Minn.	18.00	18.00	17.00	18.50
Birmingham	13.50	12.50	12.50	18.50
Provo, Utah	16.50			

### DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass.	\$19.00	\$19.50	\$18.50	\$20.00
From Buffalo	19.00	19.50	18.50	20.00
Brooklyn				
From East. Pa. or Buffalo	20.77	21.27	20.27	21.77
Newark or Jersey City, N. J.				
From East. Pa. or Buffalo	19.89	20.39	19.39	20.89
Philadelphia				
From Eastern Pa.	19.26	19.76	18.76	20.26
Cincinnati				
From Hamilton, Ohio	18.51	18.51	18.01	19.01
Canton, Ohio				
From Cleveland and Youngstown	18.76	18.76		
Columbus, Ohio				
From Hamilton, Ohio	19.50	19.50		
Mansfield, Ohio				
From Cleveland and Toledo	19.26	19.26		
Indianapolis				
From Hamilton, Ohio	19.77	19.77		
South Bend, Ind.				
From Chicago	19.55	19.55		
Milwaukee				
From Chicago	18.50	18.50		
St. Paul				
From Duluth	19.44			
Davenport, Iowa				
From Chicago	19.26	19.26		
Kansas City				
From Granite City	20.04	20.54		

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

### LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa. Steel-	ton, Pa. and Standish, N.Y.
Johnson City, Tenn.	\$23.00
Del'd Chicago	28.85

### GRAY FORGE PIG IRON

Valley furnace	\$17.50
----------------	---------

### CHARCOAL PIG IRON

Lake Superior furnace	\$20.50
Delivered Chicago	23.54
Delivered Buffalo	23.78

### CANADA

#### Pig Iron

Per gross ton:	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$21.00
No. 2 fdy., sil. 1.75 to 2.75.....	20.50
Malleable.....	21.00

Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	\$22.50
No. 2 fdy., sil. 1.75 to 2.25.....	22.00
Malleable .....	22.50
Basic .....	22.00

### Ferromanganese

	<i>Per Gross Ton</i>
Domestic, 80%, seaboard, (carload) .....	\$85.00
Domestic, 80%, seaboard, (ton lots) .....	92.00

### Spiegeleisen

Domestic, 19 to 21%	\$27.00
---------------------	---------

### Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	\$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid)	31.00
14% to 16% (less carloads)	38.50

### Silvery Iron

F.o.b. Jackson, Ohio, Furnace	
-------------------------------	--

Per Gross Ton	Per Gross Ton
6% \$22.25	12% \$29.25
7% 23.25	13% 30.75
8% 24.25	14% 32.25
9% 25.25	15% 33.75
10% 26.25	16% 35.25
11% 27.75	17% 36.75

Ferrovanadium, del., per	
lb. contained V.	\$2.70 to \$2.90
Ferrocobalt, 15 to 18%	
Tl. 6 to 8% C. f.o.b. furnace,	
carload and contract per net ton	\$137.50
Ferrophosphorus, electric, or blast	
furnace material, in carloads,	
18%, Rockdale, Tenn., base, per	
gross ton with \$2 unitage	50.00
Ferrophosphorus, electric, 24%	
f.o.b. Anniston, Ala., per gross	
ton with \$2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo.,	
del.	80c.
Silico spiegel, per ton, f.o.b. fur-	
nace, car lots	\$39.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, deliv-	
ered:	
2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices	\$5 a ton higher

### Ores

Lake Superior Ores, Delivered Lower Lake Ports	Per Gross Ton
Old range, Bessemer, 51.5% iron	\$4.80
Iron range, non-Bessemer, 51.50%	4.85
Mesabi Bessemer, 51.50% iron	4.85
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

### Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9.50c.
Iron, low phos., Swedish, average 68 1/2% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52%	24c.
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48 1/2%	20c.

	Per Net Ton Unit
Tungsten, Chinese wolframite, duty paid, delivered*	\$15.00
Tungsten, domestic scheelite, delivered	\$14.50 to \$15.00

	Per Gross Ton
Chrome, 45%, Cr <sub>2</sub> O <sub>3</sub> , crude, c.i.f.	
Atlantic Seaboard .....	\$17.00
Chrome, 48%, Cr <sub>2</sub> O <sub>3</sub> , c.i.f. At-	
lantic Seaboard .....	20.00

\*Quotations nominal in absence of sales.

### Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b.	
Kentucky and Illinois mines.....	\$16.00
No. 2 lump, 85-5, f.o.b. Kentucky	
and Illinois mines.....	16.00
Foreign, 85% calcium fluoride, not	
over 5% silicon, c.i.f. Atlantic	
port, duty paid.....	18.50
Domestic, No. 1 ground bulk, 85 to	
98% calcium fluoride, not over	
2 1/2% silicon, f.o.b. Illinois and	
Kentucky mines.....	30.80

# Iron and Steel Scrap

## PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$14.00 to \$14.50
No. 2 heavy melting steel	12.50 to 13.00
No. 2 railroad wrought	14.00 to 14.50
Scrap rails	14.00 to 14.50
Rails 3 ft. and under	15.00 to 15.50
Sheet bar crops, ordinary	15.00 to 15.50
Compressed sheet steel	13.50 to 14.00
Hand bundled sheet steel	12.00 to 12.50
Hvy. steel axle turnings	12.00 to 12.50
Machine shop turnings	10.50 to 11.00
Short shov. steel turnings	10.50 to 11.00
Short mixed borings and turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Cast iron carwheels	12.00 to 12.50
Heavy breakable cast	11.50 to 12.00
No. 1 cast	12.00 to 12.50
Railr. knuckles and coup- lers	15.50 to 16.00
Rail, coil and leaf springs	15.50 to 16.00
Roller steel wheels	15.50 to 16.00
Low phos. billet crops	16.00 to 16.50
Low phos. sheet bar crops	15.50 to 16.00
Low phos. plate scrap	15.00 to 15.50
Low phos. punchings	15.50 to 16.00
Steel car axles	15.50 to 16.00

## CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	
Heavy melting steel ....	\$10.50 to \$11.00
Shovelling steel .....	10.50 to 11.00

Hydraulic comp. sheets	\$9.25 to \$9.75
Drop forge flashings	8.50 to 9.00
No. 1 busheling	9.75 to 10.25
Roller carwheels	11.75 to 12.25
Railroad tires	11.75 to 12.25
Railroad leaf springs	11.50 to 12.00
Axle turnings	8.75 to 9.25
Steel couplers and knuckles	11.75 to 12.25
Coil springs	12.25 to 12.75
Axle turnings (elec. fur.)	9.25 to 9.75
Low phos. punchings	12.50 to 13.00
Low phos. plates, 12 in.	
and under	12.50 to 13.00
Cast iron borings	6.50 to 7.00
Short shoveling turnings	6.75 to 7.25
Machine shop turnings	6.50 to 7.00
Revolving rails	12.00 to 12.50
Steel rails, less than 3 ft.	12.25 to 12.75
Steel rails, less than 2 ft.	12.75 to 13.25
Angle bars, steel	11.75 to 12.25
Cast iron carwheels	11.75 to 12.25
Railroad malleable	11.75 to 12.25
Agricultural malleable	9.25 to 9.75

<i>Per Net Ton</i>	
Iron car axles .....	\$12.25 to \$12.75
Steel car axles .....	12.00 to 12.50
No. 1 railroad wrought...	9.25 to 9.75
No. 2 railroad wrought...	9.25 to 9.75



No. 2 busheling	\$4.00 to \$4.50
Locomotive tires, smooth	9.00 to 9.50
Pipe and flues	5.25 to 5.75
No. 1 machinery cast	9.50 to 10.00
Clean automobile cast	9.00 to 9.50
No. 1 railroad cast	9.00 to 9.50
No. 1 agricultural cast	8.00 to 8.50
Stove plate	7.50 to 8.00
Grate bars	6.50 to 7.00
Brake shoes	8.50 to 9.00

#### PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$11.50 to \$12.00
No. 2 heavy melting steel	9.50
No. 1 railroad wrought	11.00
Bundled sheets	9.50
Hydraulic compressed, new	10.00
Hydraulic compressed, old	7.00 to 7.50
Machine shop turnings	7.50
Heavy axle turnings	10.00 to 10.50
Cast borings	5.50 to 6.00
Heavy breakable cast	11.50 to 12.00
Stove plate (steel works)	9.50
No. 1 low phos. heavy	15.00 to 15.50
Couplers and knuckles	14.50 to 15.00
Roller steel wheels	14.50 to 15.00
No. 1 blast furnace	8.50 to 9.00
Spec. iron and steel pipe	16.00
Shafting	16.50
Steel axes	14.50
No. 1 forge fire	11.00
Cast iron car wheels	12.50 to 13.00
No. 1 cast	12.00 to 13.00
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	13.00

#### CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$11.00 to \$11.50
No. 2 heavy melting steel	10.50 to 11.00
Compressed sheet steel	10.00 to 10.50
Light bundled sheet stamp-	
ings	6.50 to 7.00
Drop forge flashings	9.50 to 10.00
Machine shop turnings	8.25 to 8.75
Short shoveling turnings	8.50 to 9.00
No. 1 busheling	10.00 to 10.50
Steel axle turnings	8.50 to 9.00
Low phos. billet crops	12.50 to 13.00
Cast iron borings	8.25 to 8.75
Mixed borings and short	
turnings	8.25 to 8.75
No. 2 busheling	8.25 to 8.75
No. 1 cast	10.50 to 11.00
Railroad grate bars	8.50 to 9.00
Stove plate	7.50 to 8.00
Roller steel wheels	14.00 to 14.50
Rolls for rolling	14.00 to 14.50
Railroad malleable	11.75 to 12.00
Cast iron carwheels	11.00

#### BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel	\$12.00 to \$12.50
No. 2 heavy melting scrap	10.50 to 11.00
Scrap rails	11.50 to 12.00
New hydraulic comp. sheets	10.50 to 11.00
Old hydraulic comp. sheets	7.50 to 8.00
Drop forge flashings	10.00 to 10.50
No. 1 busheling	10.50 to 11.00
Hvy. steel axle turnings	9.50 to 10.00
Machine shop turnings	6.75 to 7.25
Knuckles and couplers	13.50 to 14.00
Coil and leaf springs	13.50 to 14.00
Bolted steel wheels	13.50 to 14.00
Low phos. billet crops	14.00 to 14.50
Short shov. steel turnings	8.00 to 8.50
Short mixed borings and	
turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
No. 2 busheling	7.50 to 8.00
Steel car axles	13.00 to 13.50
Iron axes	13.00 to 13.50
No. 1 machinery cast	12.00 to 13.00
No. 1 cupola cast	11.00 to 11.50
Stove plate	10.00 to 10.50
Steel rails, 3 ft. and under	13.00 to 14.00
Cast iron carwheels	12.00 to 12.50
Industrial malleable	11.50 to 12.00
Railroad malleable	12.00 to 13.00
Chemical borings	10.00 to 11.00

#### BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$10.00
Scrap steel rails	9.00
Short shoveling turnings	5.50
Stove plate	7.00 to 7.50
Steel axes	10.50 to 11.00
Iron axes	10.50 to 11.00
No. 1 railroad wrought	7.00
Rolls for rolling	7.00
No. 1 cast	9.00 to 9.50
Tramcar wheels	9.00 to 9.50
Cast iron borings, chem.	8.00

#### ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$10.50 to \$11.00
No. 1 heavy melting	9.25 to 9.75
No. 2 heavy melting	8.50 to 9.00
No. 1 locomotive tires	9.00 to 9.50
Misc. stand.-sec. rails	12.00 to 12.50
Railroad springs	11.50 to 12.00
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	9.25 to 9.75
No. 1 busheling	6.50 to 7.00
Cast iron borings and	
shoveling turnings	5.25 to 5.75
Rolls for rolling	12.50 to 13.00
Machine shop turnings	6.00 to 6.50
Heavy turnings	6.00 to 6.50
Steel car axles	11.25 to 11.75
Iron car axles	12.50 to 13.00
Wrot iron bars and trans.	9.75 to 10.25
No. 1 railroad wrought	6.75 to 7.25
Steel rails less than 3 ft.	12.50 to 13.00
Steel axle bars	11.50 to 12.00
Cast iron carwheels	9.00 to 9.50
No. 1 machinery cast	9.00 to 9.50
Railroad malleable	9.00 to 9.50
No. 1 railroad cast	8.50 to 9.00
Stove plate	6.50 to 7.00
Relay rails, 60 lb. and	
under	16.00 to 16.50

Relay rails, 60 lb. and	
over	\$20.00 to \$21.00
Agricult. malleable	9.00 to 9.50

#### BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.50 to \$7.75
Scrap T rails	7.25 to 7.50
Machine shop turnings	3.50 to 4.00
Cast iron borings	4.00 to 4.25
Bundled skeleton, long	5.25 to 6.00
Forge flashings	5.50 to 5.75
Blast furnace scrap	10.50 to 11.00
Shafting	10.50 to 11.00
Steel car axles	10.00 to 10.50
Wrought pipe	4.75 to 5.00
Stove plate	4.50 to 4.75
Cast iron borings, chemical	9.00 to 9.50
Per gross ton delivered consumers' yards:	
Tattle cast	\$10.00 to \$10.50
No. 1 machinery cast	10.00 to 10.50
Railroad malleable	11.00 to 11.50

#### NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$8.00 to \$9.00
No. 2 heavy melting steel	6.50 to 7.50
Heavy breakable cast	7.50 to 8.00
No. 1 machinery cast	8.00 to 8.50
No. 2 cast	6.75 to 7.25
Stove plate	5.50 to 5.75
Steel car axles	10.50 to 10.75
No. 1 railroad wrought	7.50 to 8.00

#### PITTSBURGH

Base per Lb.	
Plates	3.05c
Structural shapes	3.05c
Soft steel bars and small shapes	2.85c
Reinforcing steel bars	3.00c
Cold-finished and screw stock—	
Round and hexagons	*3.45c
Squares and flats	*3.45c
Hoops and bands, under 1/2 in.	3.10c
Hot-rolled annealed sheets (No. 24),	
25 or more bundles	3.15c
Galv. sheets (No. 24), 25 or more	
bundles	3.70c
Hot-rolled sheets (No. 10)	2.85c
Galv. corrug. sheets (No. 28), per	
square (more than 3750 lb.)	\$5.33
Spikes, large	2.99c
Track bolts, all sizes, per 100 count,	
65 per cent off list.	
Machine bolts, 100 count,	
65 per cent off list.	
Carriage bolts, 100 count,	
65 per cent off list.	
Nuts, all styles, 100 count,	
65 per cent off list.	
Large rivets, base per 100 lb.	\$3.25
Wire, black, soft ann'd, base per	
100 lb.	*2.575c
Wire, galv. soft, base per 100 lb.	*2.925c
Common wire nails, per keg.	*2.557c
Cement coated nails, per keg.	*2.557c

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

\*Delivered in Pittsburgh switching district.

#### CHICAGO

Base per Lb.	
Plates and structural shapes	3.10c
Soft steel bars	2.90c
Cold-fn. steel bars and shafting	
Round and hexagons	3.40c
Plats and squares	3.40c
Bands, 3/16 in. (in Nos. 10 and	
12 gages)	3.20c
Hoops (No. 14 gage and lighter)	3.20c
Hot-rolled annealed sheets (No. 24)	3.70c
Galv. sheets (No. 24)	4.30c
Hot-rolled sheets (No. 10)	2.85c
Spikes (9/16 in. and lighter)	3.50c
Track bolts	4.65c
Rivets, structural (keg lots)	3c
Rivets, boiler (keg lots)	3.10c
Per Cent Off List	
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coast and lag screws	60 and 5
Hot-pressed nuts, sq. tap or	
blank	60 and 5
Hot-pressed nuts, hex. tap or	
blank	60 and 5
Hex. head and cap screws	80
Cup point set screws	70
Flat head bright wood screws, 3/4 and 10	
Spring cotters	50
Stove bolts in full packages	72 1/2
Rd. hd. tank rivets, 7/16 in. and	
smaller	65
Wrought washers	\$5.50 off list
No. 8 black ann'd wire per 100 lb.	\$3.75
Com. wire nails, base per keg.	2.70c
Cement c'd nails, base per keg.	2.70c

#### NEW YORK

Base per Lb.	
Plates	3.30c
Structural shapes	3.27c
Soft steel bars, small shapes	3.17c
Iron bars	3.24c
Iron bars, welded charcoal	3.70c
Cold-fn. shafting and screw stock;	
Round and hexagons	3.92c
Flats and squares	4.42c
Cold-roll. strip, soft and quarter	
hard	4.00c
Hoops	3.42c
Bands	3.42c
Hot-rolled sheets (No. 10)	3.17c
Hot-rolled ann'd sheets (No. 24)*	3.65c
Galvanized sheets (No. 24)*	4.25c
Long term sheets (No. 24)	5.00c
Standard tool steel	12.00c
Wire, black annealed (No. 10)	3.30c
Wire, galv. annealed (No. 10)	4.05c

No. 1 yard wrought, long	\$6.50 to \$7.00
Spec. iron and steel pipe	5.75 to 6.00
Forge fire	5.50 to 6.00
Rails for re-rolling	9.00 to 9.25
Short shoveling turnings	3.00 to 3.50
Machine shop turnings	3.50 to 3.75
Cast borings	4.50 to 4.75
No. 1 blast furnace	2.50 to 3.00
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and	
steel	5.00 to 5.25
Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$11.00
No. 1 hvy. cast (cupola	
size)	10.00
No. 2 cast	9.00

#### CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$8.25 to \$9.00
Scrap rails for melting	9.00 to 9.50
Loose sheet clippings	4.75 to 5.25
Bundled sheets	6.00 to 6.50
Cast iron borings	6.00 to 6.50
Machine shop turnings	5.50 to 6.00
No. 1 busheling	6.50 to 7.00
No. 2 busheling	3.50 to 4.00
Rails for rolling	9.50 to 10.00
No. 1 locomotive tires	9.00 to 9.50
Short rails	11.75 to 12.25
Cast iron carwheels	8.25 to 8.75
No. 1 machinery cast	9.50 to 10.00
No. 1 railroad cast	9.00 to 9.50
Burnt cast	6.50 to 7.00
Stove plate	6.50 to 7.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	9.00 to 9.50

Tire steel 1/2 x 1/4 in. and larger	3.50c
Smooth finish, 1 to 2 1/2 x 1/4 in.	
and larger	3.75c
Open hearth spring steel, base	
per 100 lb.	4.00c to 10.00c
Common wire nails, base, per keg	\$3.00
Per Cent Off List	
Machine bolt, cut thread:	
1/2 x 6 in. and smaller	60
1 x 30 in. and smaller	60
Carriage bolts, cut thread:	
1/2 x 6 in. and smaller	60
1/2 x 20 in. and smaller	50
Boiler tubes:	
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

#### ST LOUIS

Base per Lb.	
Plates and struc. shapes	3.34c
Bars, soft steel or iron	3.14c
Cold-fn. rounds, shafting, screw	
stock	3.74c
Hot-rolled annealed sheets (No. 24)	3.94c
Galv. sheets (No. 24)	4.54c
Hot-rolled sheets (No. 10)	3.19c
Black corrug. sheets (No. 24)	3.59c
*Galv. corrug. sheets	3.59c
Structural rivets	3.59c
Boiler rivets	3.69c
Per Cent Off List	
Tank rivets, 7/16 in. and smaller	60
Machine and carriage bolts, lag screws,	
fitting up bolts, bolt ends, plug bolts,	
hot-pressed nuts, square and hexagon,	
tapped or blank, semi-finished nuts	
100 lb. or over	60
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

\*No. 26 and lighter take special prices.

#### PHILADELPHIA

Base per Lb.	
*Plates, 1/4-in. and heavier	2.75c
*Structural shapes	2.75c
*Soft steel bars, small shapes, iron	
bars (except bands)	2.75c
*Reinforce. steel bars, sq. twisted	
and deformed	2.505c
Cold-finished steel bars	3.73c
*Steel hoops	3.30c
*Steel bands, No. 12 to 3/16 in.,	
incl.	3.05c
Spring steel	5.00c
*Hot-rolled annealed sheets (No. 24)	3.40c
*Galvanized sheets (No. 24)	4.00c
*Hot-rolled annealed sheets (No.	
10)	2.95c
Diam. pat. floor plates, 1/4 in.	4.75c
Swedish iron bars	6.25c

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

\*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For 5 tons or more, exclusive of cutting charge.

#### CLEVELAND

Base per Lb.	
Plates and struc. shapes	3.21c
Soft steel bars	2.90c
Reinforce. steel bars	2.00c to 2.50c
Cold-finished steel bars	3.40c
Flat rolled steel under 1/2 in.	3.26c
Cold-finished strip	5.55c
Hot-rolled annealed sheets (No. 24)	3.76c
Galvanized sheets (No. 24)	4.36c
Hot-rolled sheets (No. 10)	3.01c
Black ann'd wire, per 100 lb.	\$2.45
No. 9 galv. wire, per 100 lb.	2.80
Com. wire nails, base per keg.	2.45

#### CINCINNATI

Base per Lb.	
Plates and struc. shapes	3.30c
Bars, soft steel or iron	3.10c

#### DETROIT

Dealers' buying prices per gross ton:	
Heavy melting steel	\$9.50 to \$10.00
Borings and short turnings	7.50 to 8.00
Long turnings	6.50 to 7.00
No. 1 machinery cast	10.50 to 11.00
Automotive cast	11.75 to 12.25
Hydraulic comp. sheets	9.75 to 10.25
Stove plate	7.25 to 7.75
New factory busheling	8.50 to 9.00
Old No. 2 busheling	6.00 to 6.50
Sheet clippings	6.75 to 7.25
Flashings	8.25 to 8.75
Low phos. plate scrap	10.25 to 10.75

#### CANADA

Dealers' buying prices per gross ton:	
	Toronto Montreal
Heavy melting steel	\$5.50 \$5.50
Rails, scrap	6.00 4.50
Machine shop turnings	2.50 2.50
Boiler plate	4.50 4.50
Heavy axle turnings	2.50 2.50
Cast borings	3.00 3.00
Steel borings	2.00 2.00
Wrought pipe	2.50 2.50
Steel axes	4.50 4.50
Axis wrought iron	4.50 4.50
No. 1 machinery cast	7.75 9.00
Stove plate	4.50 5.00

## More Railroad Requests For PWA Loans

WASHINGTON, Feb. 20.—Applications were made today to the Interstate Commerce Commission by the Delaware, Lackawanna & Western and the Erie railroads for authority to borrow public works funds to be used for the purchase and repair of equipment. Allotments of the funds have already been made by the PWA.

The Lackawanna is seeking \$4,666,000, to be used for the purchase of 20 steam locomotives, five oil-electric locomotives and 500 50-ton steel hopper cars. It also will use the money for the reconstruction in its shops at Scranton, Pa., of 986 wooden-sheathed box cars into steel box cars and 20 road engines into modern drill or switch engines.

The Erie application is for \$623,000, to be used for the conversion of 750 70-ton drop-bottom gondola cars into self-clearing hopper cars.

WASHINGTON, Feb. 20.—The Baltimore & Ohio Railroad yesterday applied to the Interstate Commerce Commission for authority to borrow \$1,500,000 from the Public Works Administration to be used for the purchase of 35,000 tons of rails and also fastenings and track material. The allotment has been made by the PWA. The total cost of the requirements will be \$2,350,406. The carrier will use its own funds above the amount sought. The board of directors, however, has authorized the carrier to borrow \$5,500,000 for future purchases. The immediate application is to be used to buy 29,000 tons of 131-lb. and 6000 tons of 112-lb. rails, 9574 tons of tie plates, 1261 tons of track spikes and 341 tons of track bolts, together with other track material.

In addition it is planned later to construct 820 steel gondola cars at the company's shops in Keyser, W. Va., to repair 240 locomotives, 5000 freight cars and reconstruct 200 automobile cars with loading appliances.

ST. LOUIS, Feb. 20.—Federal Judge Faris today granted permission to trustees of the St. Louis-San Francisco railway to expend \$1,603,053 for improvements and betterments in 1934, including 100 miles of 112-lb. rails and accessories and all other items listed in THE IRON AGE of Feb. 8, except building two oil electric cars \$150,000, which item was withdrawn from the road's application.

WASHINGTON, Feb. 20.—Public Works Administrator Ickes today signed a contract for a loan of \$5,028,000 to the New York, Chicago & St. Louis to be used for the purchase of 1200 freight cars, 15 freight locomotives, 5 switching locomotives, 20 extra locomotive tenders, 7 passenger coaches and one mail car.

## OBITUARY

CHARLES A. YOST, general manager, Massillon Bridge & Structural Division, Massillon, Ohio, of the Fort Pitt Bridge Works, died suddenly Feb. 17. He had been in poor health two weeks. He had been connected with the company and its predecessor, the Massillon Bridge & Structural Co., about 30 years.

ROY BERRYMAN, District sales manager, Detroit Seamless Steel Tubes Co., died after a brief illness at Detroit on Feb. 11. MR. BERRYMAN was born in Harrisburg, Ontario, Canada, Mar.

15, 1888 and came to United States 26 years ago becoming identified with the steel industry at that time. For the last 12 years MR. BERRYMAN has represented Detroit Seamless Steel Tubes Co., having been made district sales manager for Detroit and Michigan about a year ago.

THORNTON H. BISSELL, for the past 11 years advertising manager of the International Nickel Co., New York, died at his home here on Feb. 18, aged 45 years. He was born in Trenton, N. J., and was graduated from the New Jersey State Teachers College.

*Send for your copy of this* **NEW WYCKOFF STEEL CHART**

**YOU** will find it invaluable in selecting the right grade of cold drawn steel for any specific purpose.

**WYCKOFF DRAWN STEEL CO. . . . Ambridge, Pa.**

Please send the new WYCKOFF STEEL CHART

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_



# Fabricated Structural Steel

## Lettings Again Higher—New Projects Decline

**I**NCLUDING 5000 tons for a bridge across the Choptank River at Cambridge, Md., and 4000 tons for poles for Pennsylvania Railroad electrical work, awards totaled 14,925 tons, compared with 11,650 tons last week. New projects of 10,825 tons compare with 22,945 tons in the previous week and 19,450 tons two weeks ago. The largest inquiries reported are 2500 tons for a bridge at North Bend, Ore., on Coos Bay, and 2000 tons for a bridge at Yaquina Bay, Ore. Steel piling awards for Government work call for 7600 tons. Structural steel awards for the week follow:

### NORTH ATLANTIC STATES

New York, 115 tons, West Thirteenth Street warehouse for New York Central Railroad, to Harris Structural Steel Co.

Erie, Pa., 135 tons, highway bridge, to McClintic-Marshall Corp.

Boston, 3500 tons sheet piling for Army Base pier to Kalman Steel Corp.

Quincy, Mass., 700 tons sheet piling for Fore River bridge substructure, to Kalman Steel Corp.

West Point, N. Y., 700 tons, academy gymnasium, to McClintic-Marshall Corp.

Brooklyn, 250 tons, Interborough Parkway bridge, to McClintic-Marshall Corp.

Roslyn, L. I., 200 tons, Northern State Parkway bridge, to Phoenix Bridge Co.; sublet by National Bridge Works.

Buffalo, 400 tons sheet piling for CWA city jobs to local bidder.

Philadelphia, 4000 tons of steel poles for Pennsylvania Railroad electrification work, to McClintic-Marshall Corp.

Philadelphia, 150 tons, Home for Incurables, to Robinson Iron & Steel Co.

Cambridge, Md., 5000 tons, Choptank River bridge, to McClintic-Marshall Corp.; Frederick Snare Corp., general contractor.

Aberdeen, Md., 155 tons, ordnance magazines, to Dietrich Brothers.

State of Maryland, 330 tons, highway bridges at Rocks and Chestertown, to Fort Pitt Bridge Works Co.

### SOUTH AND SOUTHWEST

Fort Humphries, Va., 270 tons, warehouse for United States Government, to McClintic-Marshall Corp.

Fort Bragg, N. C., 410 tons, Army ordnance shops, to Southern Engineering Co., Charlotte, N. C.

La Branch, La., 1100 tons, bridge for Illinois Central, to Virginia Bridge & Iron Co.

Seminole County, Okla., 250 tons, highway bridge, to Pittsburgh-Des Moines Steel Co.

Pottawatomie County, Okla., 215 tons, highway bridge, to J. B. Klein Iron & Foundry Co.

### CENTRAL STATES

Tippecanoe County, Ind., 150 tons, bridge, to Midland Structural Steel Co.

Chicago, 400 tons, pumping station, to McClintic-Marshall Corp.

State of Missouri, 525 tons, bridge, to Stupp Brothers Bridge & Iron Co.

Saline County, Kan., 150 tons, bridge, to Capitol Iron Works Co., Topeka.

Guttenberg, Iowa, 1500 tons, sheet piling for dam across Mississippi River, to Bethlehem Steel Co.

Dubuque, Iowa, 1500 tons, sheet piling for dam across Mississippi River, to Bethlehem Steel Co.

### WESTERN STATES

Los Angeles, 120 tons, tunnel supports for Metropolitan Water District, to McClintic-Marshall Corp. and Commercial Shearing & Stamping Co.

Trona, Cal., 300 tons, American Potash & Chemical Corp., to Ingalls Iron Works.

### NEW STRUCTURAL STEEL PROJECTS

#### NORTH ATLANTIC STATES

Quincy, Mass., 5000 tons, Fore River bridge superstructure; bids, March 6.

Forest Hills, L. I., 250 tons, bridge 2A over Union Turnpike; Wilson & English Construction Co., New York, general contractor.

Saratoga Springs, N. Y., 400 tons, State administration building and laboratory.

Passaic, N. J., 940 tons, Pequannock River viaduct.

Fort Monmouth, N. J., 200 tons, Government headquarters building.

State of Pennsylvania, 630 tons, highway bridges at York City and Meshoppen Boro.

Aberdeen, Md., 325 tons, garage and storehouse for Government.

#### THE SOUTH

State of Virginia, 1040 tons, bridges at Roanoke and Tipton Ferry.

Fredricksburg, Va., 740 tons, bridge.

#### CENTRAL STATES

Cleveland, 445 tons, plant addition for Steel & Tubes, Inc.; previously reported as 200 tons.

State of Indiana, 450 tons, highway bridges in Franklin and Owen Counties.

Bond County, Ill., 465 tons, highway bridge, bids opened Feb. 20.

Prairie du Sac, Wis., 200 tons sheet piling for bridge protection; bids Feb. 28.

Kansas City, Mo., 4800 tons, municipal auditorium; low bid of \$4,375,000 made by S. Patti Construction Co., Kansas City; Fleischer Engineering & Construction Co., St. Paul, and Ring Construction Co., Minneapolis.

Omaha, Neb., 4000 tons, bridge across Missouri River; bids to be opened March 5 by Omaha Bridge Commission.

#### WESTERN STATES

Reedville, Ore., 650 tons, bridge.

North Bend, Ore., 2500 tons, bridge at Coos Bay.

Yaquina Bay, Ore., 2000 tons, bridge.

Summit, Canal Zone, 1750 to 2250 tons, radio towers at Navy Base; United States Steel Products Co., low bidder.

### FABRICATED PLATE

#### AWARDS

Brooklyn, N. Y., 130 tons, six tanks, to Chicago Bridge & Iron Works.

Point Breeze, Pa., 210 tons, Atlantic Refining Co. tanks, to Chicago Bridge & Iron Works.

Alcatraz, Cal., 200 tons, material for Federal prison, to Colonial Steel Co.

Stockton, Cal., 200 tons, tank, to Chicago Bridge & Iron Works.

Sacramento, Cal., 150 tons, pontoons for U. S. Engineers, to Pacific Coast Engineering Co.

Sacramento, 100 tons, truck bodies, to an unnamed bidder.

Honolulu, 200 tons, pipe line for American Factors, Ltd., to an unnamed bidder.

### NEW PROJECTS

Kansas City, Mo., 4000 tons, dredge boats and pontoons; bids opened by United States Engineer's office, Feb. 17.

Oakland, Cal., 200 tons, pipe for East Bay Utilities District; Steel Tank & Pipe Co. low bidder on steel alternate.

Seattle, 100 tons sheets, culverts for Alaska Road Commission; bids Feb. 26.

Los Angeles, 290 tons, sheets, pipe for Metropolitan Water District; bids under advisement.

## Wyckoff Issues Cold Drawn Steel Chart

**A**N extremely useful reference chart designed to assist users of cold drawn steel in selecting the proper material for a particular purpose has been issued by the Wyckoff Drawn Steel Co., Ambridge, Pa., and will be distributed to interested parties requesting copies. The grades are arranged in descending order of suitability and those most commonly used are listed according to their adaptability for specific purposes. As pointed out in the chart, "the similarity of properties, the peculiarities of each grade of steel and the variations in response to particular treatment make it difficult to draw dividing lines."

In one table are listed the various types of cold-drawn steel best suited respectively for machinability, cold forming, machinability and cold forming, carburizing, machining and hardening, and heat treating for strength and toughness. Relative machinability of different grades is shown in another table, while Brinell hardness numbers in approximate averages are shown in another. Weights of rounds, squares and hexagon bars in pounds per lineal foot are also included and further tables list S. A. E. specifications on the principal kinds of automotive steels.

The chart is a splendid example of a new kind of sales effort, arising from the code of fair competition in the steel industry, in which education of the customer is the prime motive.

## Ontario Steel Concern Buys Soaking Furnace

**D**OMINION FOUNDRIES & STEEL, LTD., Hamilton, Ont., Canada, has placed an order with the James Criswell Co., Pittsburgh, for a four-hole soaking pit furnace of the regenerative type which is to be equipped with Isley furnace control apparatus.

## Cast Iron Pipe

Warren Pipe & Foundry Corp. has been awarded 400 tons of 4 to 20-in. for installation at Central Islip Hospital, Long Island.

Painesville, Ohio, plans water pipe line system. Fund of \$100,400 is being arranged through Federal aid for this and new reservoir. C. S. Fullerton, City Hall, city engineer.

Ceredo, W. Va., plans pipe line system for local water supply and for service at Kenova, W. Va. Cost about \$30,000 with pumping equipment, etc. Financing is being arranged through Federal aid. S. V. Haworth, 414 Eleventh Street, Huntington, W. Va., engineer.

Alton, Ill., plans new water pipe line system. Entire project will cost \$1,850,000 with waterworks equipment. Federal financing is being arranged. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., consulting engineer.

Chicago has ordered 250 tons of 12 to 16-in. from Glamorgan Pipe & Foundry Co.

Lake Forest, Ill., has placed 100 tons with James B. Clow & Sons.

Houston, Mo., asks bids until March 2 for pipe and equipment for waterworks. Fund of \$57,000 has been secured through Federal aid. Charles A. Haskins, Finance Building, Kansas City, Mo., is consulting engineer.

McKinney, Tex., will ask bids soon on 14,950 ft. of 6 to 10-in. for water service. Fund of \$60,000 has been arranged for this and improvements in water station. Koch & Fowler, Central Bank Building, Dallas, Tex., are engineers.

Huntington, Utah, plans new water pipe line system, replacing present lines. Cost \$75,000 with waterworks equipment. Federal financing is being arranged. W. W. Wayman, Price, Utah, is engineer.

Mitsui Co., Ltd., Tokyo, Japan, has secured award for about 90,000 ft. of various sizes pipe for water distribution at Mexico, D.F., submitting lowest bid of 15 competitive companies from United States, England, Germany, France and Mexico.

Morgan Hill, Cal., will take bids March 1 on 450 tons of 4 to 8-in.

Astoria, Ore., has taken bids on 230 tons of 6, 12 and 24-in.

Laguna Beach, Cal., has awarded general contract on a project requiring 195 tons of 4 to 16-in.

Oakland, Cal., has taken bids on 630 tons of 16-in. United States Pipe & Foundry Co. is low bidder on cast iron alternate.

Pacific States Cast Iron Pipe Co. was awarded 185 tons for Boulder Dam.

Fresno, Cal., has awarded 380 tons of 8 to 12-in. to R. D. Wood & Co.

## Analysis of Hard Metal Carbide Theory

(Concluded from Page 23)

tions 2 to 4. Fig. 2 shows the structure intermingled with individually coarser crystals, which was obtained by sintering at 1450 deg. C., whereas at 1550 deg. C. and 1650 deg. C. a very strong enlargement of the crystals can be clearly recognized. This is illustrated in Fig. 3 and 4, which show that no absolutely final condition has yet been reached and the structure is in an unstable region just as is the case during the improvement of aluminum alloys at the corresponding treatments.

According to the above, it is difficult to imagine the procedure of

cementation. Regarding the subsequent binding assumed by Hoyt, through the cobalt-tungsten-carbide eutectic, separations which appear during cooling could still very well play a rôle. Whether these analogies are apropos is still an open question; the presupposition would be that the solubility mentioned above in this solid phase drops with falling temperature.

With the newest observations of Feussner,<sup>14</sup> however, it could be imagined that, upon combining, the molecules might separate out into individual screen associations, due to diffusion through the screen of the remaining constituents. This is prevented and an action is attained, which heretofore, due to lack of every possibility of mechanical deformation, could not be reached. In like manner, during the procedure of the penetration of the solution of the cobalt in the tungsten carbide, its screen is deformed in an irregular manner, thereby resulting in a strengthening. It is, therefore, apparent why the aging, that is the sintering, need not be preceded by glowing at a higher temperature.

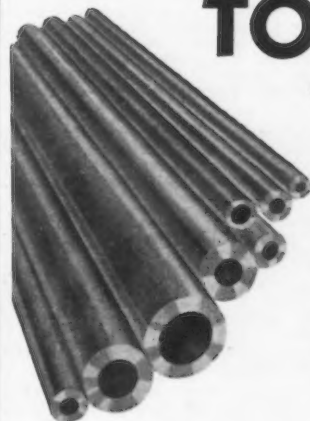
In the case of the aluminum alloys, the improvement takes place in two or three stages, glowing, quenching and aging, whereas, in the case of hard metal carbides, there is only a single heat treatment. It is difficult to know what takes place during the cooling of the carbides from sintering temperature to room temperature, especially as it is not in the power of an experimenter to change this condi-

tion appreciably. Several experiments have been made by going through this temperature span quickly, thereby resulting in a form of quenching. The resultant deterioration of the desired properties indicated that this temperature-time interval has considerable significance, according to the observations made by H. Alterthum. The current volume of work in America is expected to throw further light on the above details.

## BIBLIOGRAPHY

- <sup>1</sup> Merica, Waltenberg and Scott, Sc. Pap. Bur. Stand. 1919, No. 347.
- <sup>2</sup> R. L. Archer, Trans. Amer. Soc. Steel Tre., 1926, page 718.
- <sup>3</sup> Z. Jeffries and R. S. Archer, Chem. Met. Eng. Vol. 24 (1921), page 1057.
- <sup>4</sup> K. L. Meissner, Zt. f. Metallkunde, Vol. 17 (1925), page 77.
- <sup>5</sup> K. L. Meissner, Zt. f. Metallkunde, Vol. 21 (1929), page 328.
- <sup>6</sup> K. Trettin, Kolloid Zeitschrift, Vol. 57 (1931), 247, 370; Vol. 58 (1932), 360; Vol. 59 (1932), 101, 235, 356.
- <sup>7</sup> Frhr. v. Golder, and G. Sachs, Metallwirtschaft, Vol. 8 (1929), 671.
- <sup>8</sup> W. Fraenkel and L. Marx, Zt. Metallkunde, Vol. 21 (1929), page 2.
- <sup>9</sup> G. Wassermann, Zt. Metallkunde, Vol. 22 (1930), page 158.
- <sup>10</sup> J. Hengstenberg and G. Wassermann, Zt. Metallkunde, Vol. 23 (1931), 114.
- <sup>11</sup> J. Hengstenberg and H. Mark, Z. Physik, Vol. 61 (1930), 435.
- <sup>12</sup> G. Tammann, Z. Metallkunde, Vol. 22 (1930), 365.
- <sup>13</sup> S. Kohubo and K. Honda, Sc. Rep. Tohoku Univ., Vol. 1 (1930), 19.
- <sup>14</sup> Feussner, Metallwirtschaft, Vol. 11 (1932), 450.
- <sup>15</sup> G. J. Comstock, Machinery, Vol. 38 (1932), 735.
- <sup>16</sup> S. L. Hoyt, Hard Metal Carbides and Cemented Tungsten Carbide, Am. Inst. Min. & Met. Eng., 1930.

## NON-SHRINK, OIL HARDENING TOOL STEEL TUBING



The job of making ring dies, cutting dies, bushings spacers, etc., is half done when you start with Bissett Tool Steel Tubing. There is a size carried in stock to meet every requirement up to 12" O.D. and 2" wall thickness. Larger sizes can be supplied.

It eliminates forging, does away with annealing difficulties and cuts down machining cost.

We also supply special tubing to S.A.E. 52100 and S.A.E. 4615 analysis for Ball Bearing purposes.

Manufacturers of BISCO Tungsten Carbide and Tantalum Carbide drawing dies for wire, rod and tubing.

## THE BISSETT STEEL CO., INC.

945 E. 67th STREET, CLEVELAND, O.

Cincinnati

Pittsburgh

Buffalo



# PLANT EXPANSION AND EQUIPMENT BUYING

## Tool Builders See Accumulating Obsolescence as Future Demand Factor

**C**ONFLICTING reports from machine tool dealers and builders indicate cross-currents in the present state of machine tool demand. Orders have been, in most cases, for single machines, except from the motor car builders. Chevrolet is reported to have bought a number of milling machines during the past week for its Toledo transmission plant.

A prominent Cleveland tool builder reports continuing demand, principally from the automotive industry, and states that it would gladly put 100 skilled men to work in addition to its present force if they were available. This is an exceptional case, however, and other machine tool builders in this district are not at present in the same position.

A lull in tool demand set in the past week, although factory activity

continues in an effort to retain stocks. Efforts of tool builders are being directed toward building factory organizations and bringing shops into position to make prompt deliveries on new business. Inquiry is at high level and indicates a broadening of sale possibilities.

Builders, in general, are optimistic as to the long-term outlook, particularly in the automotive industry. It is said that if current buying of motor cars continues upon its high level, much replacement of equipment will be inevitable, since the higher operating rate is taking its steady toll in tool wear. The best of the machine tools which have been warehoused by motor builders as a surplus during the dull years have already been put to work.

### ◀ NORTH ATLANTIC ▶

**duPont Rayon Co.**, 350 Fifth Avenue, New York, manufacturer of viscose process rayon products, an interest of E. I. duPont de Nemours & Co., Wilmington, Del., plans several new multi-story units at mill at Amphyll, Va. Cost over \$4,000,000 with machinery.

**Hendrik Hudson Distilleries, Inc.**, Kinderhook, N. Y., care of Edward Risedorff, Kinderhook, chairman of board, recently organized, has taken over local plant of Risedorff Bottling Co., for new distillery. Improvements will be made with installation of equipment. Milton H. Berry, Poughkeepsie, N. Y., is vice-president.

**M. Symington Co., Inc.**, Long Island City, New York, has been organized by Moses and Allwyn E. Symington, 21-39 Forty-third Street, to manufacture metal lathing, iron furring and kindred products.

**American Can Co.**, 230 Park Avenue, New York, is considering three-story addition to branch plant at Baltimore. Cost over \$75,000 with equipment.

**Sunrise Oil Co.**, 119-02 Twenty-third Avenue, College Point, L. I., has filed plans for addition to bulk oil storage and distributing plant, including six 100,000-gal. capacity tank units and auxiliary equipment.

**New York, New Haven & Hartford Railroad Co.**, Grand Central Terminal, New York, has plans for extensions and improvements in power plant at Cos Cob, Conn., including additional equipment. Cost over \$300,000 with equipment. Gibbs & Hill, Pennsylvania Station, New York, are consulting engineers.

**Schoonmaker & Stark, Inc.**, New York, has been organized by Arthur B. Burke, 100 East Forty-second Street, and Kermit Ballin, 35-31 146th Street, Northern Boulevard, Flushing, L. I., to manufacture mechanical equipment and operate a general machine works.

**John Wiley Jones Co.**, LeRoy, N. Y., manufacturer of water softeners, etc., has begun erection of one-story branch factory at Long Island City, New York, for metropolitan production and distribution.

**Copeland Refrigeration Co. of New York**, 480 Lexington Avenue, representative for Copeland Products, Inc., Mount Clemens, Mich., manufacturer of electric refrigerators, has leased floor in building at Fortieth Avenue

and Twenty-third Street, Long Island City, for new factory branch, service and repair works.

**Department of Public Markets**, Municipal Building, New York, William Fellowes Morgan, Jr., commissioner, plans expansion and improvements at Bronx Terminal Market, including new refrigerating machinery, air-conditioning equipment, cold storage facilities, conveyors, etc. A group of 75 new buildings is proposed. Entire project will cost over \$500,000 with equipment.

**Ashley Welding, Machine & Iron Co., Inc.**, Kingston, N. Y., has been organized by Charles P. Ashley, 287 Pearl Street, and J. Francis Brennan, 50 Brewster Street, both Kingston, to operate a general machine and welding works, and manufacture metal specialties.

**Campbell Soup Co.**, Camden, N. J., is taking bids on two and five-story addition to branch plant on West Thirty-fifth Street, Chicago. Cost about \$800,000 with machinery, tanks, piping, conveyors, etc. Unit is scheduled for completion next August. Battey & Kipp, Inc., 231 South LaSalle Street, Chicago, are architects.

**Board of Education**, Egg Harbor City, N. J., plans manual training department in new multi-story high school. Cost over \$175,000. Byron H. Edwards, Inc., 548 Federal Street, Camden, N. J., is architect.

**Globe-Wernicke Co.**, Cincinnati, bankrupt, plant at Avenel, N. J., operated in name of Steel Equipment Corp., a subsidiary, manufacturer of steel desks, filing cabinets and other steel office equipment, has been purchased at public sale by Ralph A. Gamble, 551 Fifth Avenue, New York, attorney, representing a company whose name is temporarily withheld. New owners are said to be planning early operation for similar line of production.

**Sandura Co., Inc.**, Finance Building, Philadelphia, manufacturer of hard-surfaced floorings, plans rebuilding main plant at Paulsboro, N. J., recently destroyed by fire. Loss over \$500,000 with machinery. Robert Stewart is plant superintendent.

**Premier Wire Corp.**, Newark, N. J., has been organized by Albert Harris and Walter M. Modrow, 46 Green Street, to manufacture wire products.

**Chevrolet Motor Co.**, Westmoreland and Stokley Streets, Philadelphia, headquarters at Detroit, has asked bids on general contract for one-story addition, about 30,000 sq. ft.

floor space, to factory branch at first noted location. Cost about \$50,000 with equipment.

**Atlantic Refining Co.**, 260 South Broad Street, Philadelphia, let general contract to Provo Brothers, 11 Hiawatha Boulevard, Syracuse, N. Y., for new bulk oil storage and distributing plant on State Barge Canal, Syracuse. Cost about \$70,000 with equipment. Similar plants are planned at Rochester and Albany, N. Y., likewise on Barge Canal, to cost close to like amount.

### ◀ OHIO AND INDIANA ▶

**Fisher Body Corp.**, East 140th Street and Coit Road, Cleveland, headquarters in General Motors Building, Detroit, has let general contract to J. A. Utley, Penobscot Building, Detroit, for one-story addition, 86 x 160 ft., to be used in part for storage and distribution. Cost about \$40,000 with equipment.

**Buckeye Forging Co.**, 10003 Harvard Avenue, Cleveland, has let general contract to A. E. Rowe, 1291 East 133rd Street, for one-story addition to hammer and forge shop. Christian, Schwarzenberg & Gaede, 1836 Euclid Avenue, are architects.

**Contracting Officer, Material Division**, Wright Field, Dayton, Ohio, asks bids until Feb. 27 for 152 sets ignition shielding assemblies and 2340 spark plug shields (Circular 272), 280,000 ft. cable (Circular 285), 13,212 flashlight batteries (Circular 271); until Feb. 28, 100 fuel pump flexible drive shaft assemblies (Circular 278).

**Henderson Tire & Rubber Co.**, Bucyrus, Ohio, recently organized, has acquired machinery of Erie Rubber Corp., Sandusky, Ohio, and will remove to Bucyrus, where new mill is being established. It is proposed to have plant ready for service in April. Financing for \$50,000 for plant has been arranged. O. C. Henderson is president and general manager.

**Heetquick Oil Burner Corp.**, Salem, Ohio, care of S. F. Odoran, Salem, president, recently organized, plans establishment of plant for manufacture of patented oil burners and oil-burning equipment. Company is arranging for sale of stock totaling \$156,250, part of fund to be used for new plant.

**United States Mfg. Co., Inc.**, 129 East Market Street, Indianapolis, has been organized by Millard E. Hall and associates, to manufacture industrial appliances and equipment.

**Town Council**, Spiceland, Ind., asks bids until Feb. 28 for equipment for municipal water system, including deep-well pumping machinery, elevated steel tank and tower, pipe lines, etc. Fund of \$45,000 has been arranged for work. R. C. Lennox and J. C. Matthews, Architects & Builders Building, Indianapolis, are consulting engineers.

### ◀ SOUTH ATLANTIC ▶

**Standard Oil Co. of Kentucky, Inc.**, Louisville, and 61 N. W. Eleventh Street, Miami, Fla., plans new bulk oil storage and distributing plant at Port Everglades, Fla. Cost over \$40,000 with tanks and other equipment. P. T. Raymond, last address noted, will be in charge of construction.

**Coffey's, Inc.**, North Wilkesboro, N. C., has been organized, capital \$100,000, by L. P. and C. D. Coffey, North Wilkesboro, to manufacture automobile equipment and accessories.

**Pacific Oil Co.**, Asheville, N. C., L. B. Jackson, local representative, plans new bulk oil storage and distributing plant. Cost about \$50,000 with tanks and other equipment.

**City Council**, North Wilkesboro, N. C., plans installation of pumping machinery and accessory equipment, pipe lines, etc., for new municipal water system. Fund of \$50,000 is being secured through Federal aid.

**United States Engineer Office**, Wilmington, N. C., asks bids until March 2 for additions and improvements in lock and dam No. 1, Cape Fear River, near Wilmington, including pumping equipment, steel pipe, 9000 lb. reinforcing steel, 1500 lb. bolts, 17,000 sq. ft. steel piling, etc.

# A Message to Machine Tool Operators

**T**HE Machine Tools you operate are modern; set up for proper feeds and speeds; small tools are perfectly ground, yet the machines in many cases *fail to produce at rated capacity*. Check up on the cutting oil! It is a most important factor. Numerous machine shut-downs, time lost in frequent tool regrindings, time and material lost in resetting, rejections due to faulty finish and inaccurate tolerances...are a few of many production failures directly traceable to unsuitable cutting lubricants.

## Improve Your Production Figures By Changing to Sunoco



Sunoco Emulsifying Cutting Oil increases the amount of metal removed in a given time, decreases time out for resharpening and lessens rejects—thereby increasing the total production that will pass inspection. (If you are on a piece work basis, you can see readily how this will increase your revenue.)

*Protect your health.* Of special interest is the fact that Sunoco is hygienic. Bacteriological tests prove that it will not permit the development of pus forming bacteria or pathogens which cause skin irritations.

*Ask your superintendent for permission to make a test with Sunoco. Learn for yourself the difference there is in the performance of cutting lubricants!*

**SUN OIL COMPANY • PHILADELPHIA**  
Offices and Warehouses in More Than 100 Cities

Subsidiary Companies:  
Sun Oil Co., Ltd., Montreal • British Sun Oil Co., Ltd., London, Eng.

# SUNOCO

EMULSIFYING  
CUTTING OIL

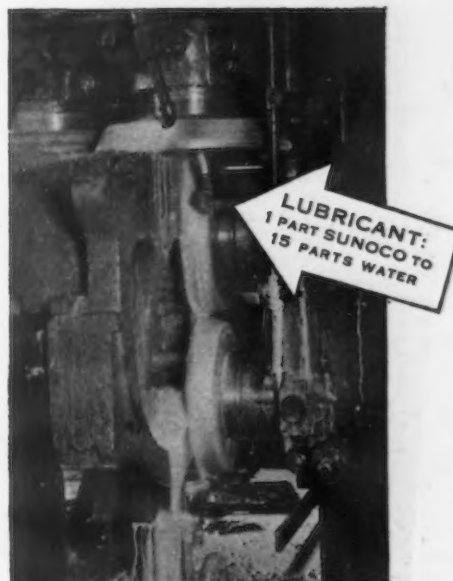
## Increases Machine Output

Made by the producers of BLUE SUNOCO MOTOR FUEL



Courtesy of **HUPP Motor Car Corp.,**  
Fostoria Div.

OPERATION: ROUGH TURNING CRANK-SHAFT PINS.  
MACHINE: LEBLOND HYDRAULIC 5-A-C AUTOMATIC PIN LATHE.  
MATERIAL: S. A. E. 1050 (HEAT TREATED).  
SPEED: TURNING 6 PINS—1 SET UP—4 1/2 MINUTES.



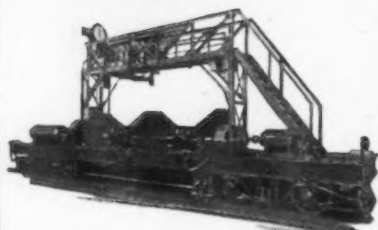
Courtesy of **CLEVELAND TRACTOR Co., Cleveland**

OPERATION: MILLING TOP, SIDES AND ENDS OF BELL HOUSING.  
MACHINE: INGERSOLL MILLING MACHINE.  
MATERIAL: .30 CARBON STEEL CASTING.  
STOCK REMOVED: 1/16 INCH TO 3/32 INCH.  
FEED: .005 INCH.  
SURFACE SPEED: 60 FEET PER MINUTE.





# ATLAS CARS



Double Compartment Scale Car with Overhead Operator's Platform. Car provided with Orr Bin Gate Operating Mechanism.



20 Ton Capacity Double Compartment Scale Car for use with Orr type Bin Gates controlled from Operator's Station on Scale Car.

## Atlas Products

Gas-Electric and Diesel-Electric Locomotives  
Electric Transfer Cars for Blast Furnaces and Steel Plants  
Stockhouse Scale Cars for Blast Furnaces  
Concentrate and Calcine Cars for Copper Refineries  
Automatic and Remote Controlled Electric Cars  
Pushers, Levellers and Door Extractors  
Coal Charging Lorries  
Coke Guides and Clay Carriers  
Atlas Patented Coke Quenching Cars for By-Product Coke Ovens  
Atlas Patented Indicating and Recording Scales  
Special Cars and Electrically Operated Cars for every conceivable purpose.

**THE ATLAS CAR & MFG. CO.**

Engineers - Manufacturers  
1140 Ivanhoe Rd., Cleveland, O.

Constructing Quartermaster, Fort Bragg, N. C., has low bid on general contract from J. A. Jones Construction Co., Charlotte, N. C., for two-story motor repair and ordnance repair shop, 76 x 300 ft., at \$137,700, exclusive of equipment.

### ◀ NEW ENGLAND ▶

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 27 for two motor-driven turret lathes and equipment (Schedule 1791), corrosion-resisting bar steel (Schedule 1796) for Portsmouth, N. H., Navy Yard.

A. & G. Caldwell, Inc., Newburyport, Mass., recently organized, has taken over former local distillery on 3-acre tract and will remodel for new plant. Company is arranging sale of stock to total \$420,000, portion of proceeds to be used for purpose noted.

Board of Selectmen, Pembroke, Mass., plans manual training department in new high school. Cost about \$100,000. Federal financing is being arranged. Frank Irving Cooper Corp., 47 Winter Street, Boston, is architect.

A. D. Waymoth Co., Fitchburg, Mass., has been organized by Robert H. Alison, 103 Walton Street, and associates, to manufacture wood-turning machines and parts.

### ◀ WESTERN PENNA. ▶

Standard Steel Car Corp., Butler, Pa., will electrify a considerable part of plant in connection with expansion and improvement program recently begun; motor-driven equipment will be installed to replace present steam-operated machinery. Certain equipment will be removed from branch plant at Ellwood City, Pa., for use in steel forging and other departments at Butler works. Facilities will be provided for working force of over 1000 men, as compared with present quota of 300 men. Program is scheduled for completion early in April, when work will begin on building 1150 steel cars for Chesapeake & Ohio Railroad. Plant program will cost about \$200,000. W. G. Heisel is plant manager.

North Pole Brewing Co., Virginia Avenue and Fifth Street, Fairmont, W. Va., will carry out expansion and improvements to develop capacity of about 100 bbl. a day. Cost over \$125,000 with machinery.

American Car & Foundry Co., 30 Church Street, New York, will make improvements at plant at Huntington, W. Va., including new equipment and replacements. Arrangements are being made to increase working force to carry out orders recently received, insuring capacity schedule for remainder of year. Luther M. Roe is acting district manager.

Columbia Plate Glass Co., Blairsville, Pa., recently organized, has taken over former local plant of National Plate Glass Co., and will remodel for new sheet glass works. Cost over \$40,000 with equipment.

### ◀ SOUTHWEST ▶

Carswell Mfg. Co., 501 South Valley Street, Kansas City, Kan., manufacturer of road-building machinery and parts, plans early rebuilding of two one-story plant units recently destroyed by fire. Loss over \$100,000 with equipment.

United States Engineer Office, Postal Telegraph Building, Kansas City, Mo., asks bids until March 1 for two electric power substations and equipment for Fort Peck, Mont., dam project; until March 14 for installation of gas distribution system, same place (Circular 21).

Common Council, Farmington, Mo., plans new municipal electric light and power plant. Cost about \$120,000 with equipment. Federal financing is being arranged. Arthur L. Mulergren, Fairfax Building, Kansas City, Mo., is consulting engineer.

Link Temperature Control Corp., Kansas City, Mo., has been organized by Samuel E. Link and A. D. Hadsell, 1307 Dierks Building, to manufacture temperature control equipment and parts.

City Council, Moberly, Mo., has engaged Russell & Axon, 4903 Delmar Boulevard, St. Louis, consulting engineers, to prepare plans for new municipal electric light and power plant. Fund of \$700,000 is being arranged for station and equipment through Federal aid.

American Carbon Co., Fort Worth, Tex., care of A. P. Barrett, Fort Worth, president, recently organized, is arranging for stock issue totaling \$1,300,000, considerable part of fund to be used for purchase of mining property and erection of refinery for production of carbon products.

Common Council, Richmond, Tex., plans installation of pumping machinery and accessories, elevated steel tank and tower, pipe lines, etc., for new municipal water system. Fund of \$58,000 has been arranged through Federal aid.

American Brewing Co., Houston, Tex., Clarence E. Shipp, president, plans early erection of new multi-story plant. Cost close to \$100,000 with equipment.

### ◀ BUFFALO DISTRICT ▶

Pleasant Valley Wine Co., Hammondsport, N. Y., has arranged for stock issue to total \$976,500, part of fund to be used for expansion.

Electrodrive Appliance Co., Inc., Syracuse, N. Y., has been organized by V. J. Houhtaling, 126 East Cheltenham Road, and Walter V. Smith, 430 Columbus Avenue, to manufacture domestic electrical appliances.

National Gypsum Co., 190 Delaware Avenue, Buffalo, plans extensions and improvements in former plant of Kalman Steel Corp., Niles, Ohio, recently acquired, for production of metal lath and other metal reinforcing products.

Berkel Products Co., Ltd., 123 York Street, Toronto, Ont., manufacturer of slicing machines, parts, etc., a subsidiary of United States Slicing Machine Co., LaPorte, Ind., has leased larger space in building at 533-35 College Street, for increased capacity.

### ◀ SOUTH CENTRAL ▶

Great Southern Alcohol Co., New Orleans, care of Edwin J. Rodriguez, 143 Sherwood Forest Drive, engineer, has plans for new plant and will soon purchase stills and accessories, bottling machinery, conveyors, steel drums, pumping machinery and other equipment. Cost over \$70,000 with machinery.

Old Joe Distilling Co., Lawrenceburg, Ky., has plans for extensions and improvements, including new equipment. One-story storage and distributing plant will be built. Company has arranged for sale of a preferred stock issue totaling \$405,000, considerable part of fund to be used for purpose noted.

Director of Purchases, Tennessee Valley Authority, New Sprinkle Building, Knoxville, Tenn., asks bids until Feb. 27 for equipment for mixing and placing concrete for new Joe Wheeler power dam project, including concrete mixer barges, whirler type revolving cranes, buckets, pumps, conveyors, storage bins, etc.

Louisiana Products Corp., Winn, La., recently referred to in these columns, has headquarters in Commercial Bank Building, Shreveport, La. Large tract of land is being selected at first noted place for new lime plant, with adjoining chemical works. Superstructures will begin early in spring. Cost over \$500,000 with machinery. W. G. Gray is president.

Louisville & Nashville Railroad Co., Louisville, plans early rebuilding of machine shop in South Louisville, recently destroyed by fire.

### ◀ WASHINGTON DISTRICT ▶

Chesapeake Distilling & Distributing Co., 804 Gorsuch Avenue, Baltimore, plans one-story addition to plant at 9 South Howard Street. Cost about \$25,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until March 6 for one motor-driven blower, one sump pump, 10,000 railroad tie plates, 10,000 lb. steel track spikes, brass machine screws, machine screw nuts, sash pulleys, flashlights, etc. (Schedule 516).

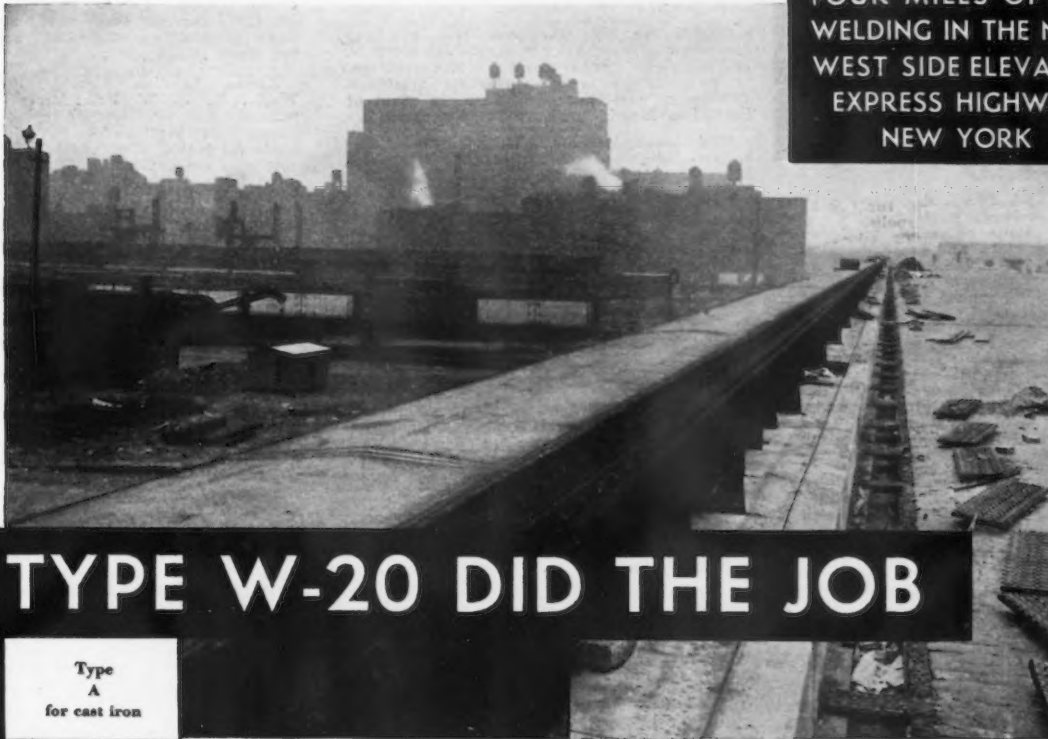
Dennis C. McAleer, 1755 Carswell Street, Baltimore, has acquired former plant of McShane Bell Foundry Co., Harford Road and Baltimore & Ohio Railroad, including equipment, and is said to be planning operation.

Common Council, Crewe, Va., plans new municipal electric light and power plant, and electric distribution system. Cost \$126,000 with equipment. Federal financing is being arranged.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until March 7 for four watertube boilers with superheaters, oil burners, fuel oil pumping and heating equipment, forced-draft and induced-draft mechanical fans, preheaters, combustion control system, soot blowers, valves, gages and auxiliary equipment for power plant at Naval

# They wanted *SPEED* in welding this elevated highway

FOUR MILES OF G-E  
WELDING IN THE NEW  
WEST SIDE ELEVATED  
EXPRESS HIGHWAY  
NEW YORK



## TYPE W-20 DID THE JOB

G-E WELDING ELECTRODES

Type  
A  
for cast iron

Type  
F  
for general  
purpose

Type  
H  
for automatic  
(coated)

Type  
L  
for structural

Type  
W-20  
for high-speed  
(heavy-coated)

Type  
W-21  
for Class I welds  
(heavy-coated)

Type  
W-85  
for manganese  
welding

**B**ECAUSE of close competition, bidders on the arc welding of cover plates for the West Side Elevated Express Highway, New York City, based their estimates on speed—footage per hour of weld.

Smith-Hamburg-Scott Welding Co., Long Island City, N. Y., the successful bidder, began the job with an electrode which, when used at a speed necessary to realize a profit, badly undercut the fillet welds—a practice not acceptable to city inspectors.

Then they tried G-E Type W-20, the high-speed, heavy-coated welding electrode that spatters so little. It eliminated undercutting, gave them a well-rounded bead and greater welding speed, the same current being used.

You may not have a penalty welding job that must be finished on time, but you'll find it profitable to use Type W-20, which produces strong, sound, high-quality, corrosion-resisting welds at high speeds. The nearest G-E welding distributor will gladly give you a sample. And remember, General Electric can supply your every welding need—welders, electrodes, cable, accessories, etc.

General Electric, Dept. 6D-201, Schenectady, N. Y.

150-23

**GENERAL**  **ELECTRIC**



Academy, Annapolis (Specification 7574); also bids (no closing date stated) for other mechanical equipment and piping, same power plant (Specification 7575).

**Bureau of Supplies and Accounts, Navy Department, Washington,** asks bids until Feb. 27 for one motor-driven pipe-threading and cutting-off machine (Schedule 1792) for Annapolis Navy Yard; until March 2, 323,750 ft. steel wire rope (Schedule 1805) for Yorktown, Va.; yard; five motor-driven diamond boring machines (Schedule 1783) for Sewall's Point, Pensacola, San Diego and other yards.

## ◀ MIDDLE WEST ▶

**Gibson Canning Co., Gibson, Ill.,** is planning addition to be used as a distillery. Cost over \$50,000 with machinery. Ford, Bacon & Davis, Inc., 39 Broadway, New York, is consulting engineer.

**Chicago Great Western Railroad Co., 122 South Michigan Avenue, Chicago,** plans extensions and improvements in locomotive repair shops at Oelwein, Iowa, including machine tools, 800-ton wheel press and accessories, 250-ton electric hoist, etc. Entire project will cost over \$100,000.

**Kelley Breweries & Distilleries, Inc., room 203, 923 Nicollet Avenue, Minneapolis, P. J. Kelley, president,** plans extensions and improvements in three-story and basement local brewery, 150 x 150 ft., converting part of property for new distillery. New equipment will be installed. Financing in amount of \$300,000 is being arranged.

**Theodore Hamm Brewing Co., 681 East Minnehaha Street, Minneapolis,** has let general contract to William Baumeister Construction Co., Pioneer Building, for extensions and improvements in brew-house, bottling works and ice-manufacturing plant. Cost over \$70,000 with machinery. C. H. Johnston, 360 Robert Street, is architect.

**Board of Education, Clinton, Iowa,** plans manual training department in new two-story and basement junior high and grade school, for which superstructure will soon begin. Cost about \$275,000. A. H. Morrell, Howes Building, is architect.

**Town Council, Shelby, Iowa,** asks bids until March 8 for equipment for new municipal electric light and power distributing system, including wire and cable, etc.

**Northern States Power Co., 15 South Fifth Street, Minneapolis,** plans extensions and improvements in power plant at Sioux Falls, S. D., including new 1000-hp. boiler unit and accessories. Cost over \$100,000 with equipment.

**Common Council, Swanton, Neb.,** plans extensions and improvements in municipal water system, including deep-well turbine pumping unit and accessories, elevated steel tank and tower, pipe lines, fittings, etc. Financing is being arranged. Henningson Engineering Co.,

Union State Bank Building, Omaha, Neb., is consulting engineer.

**American Tool Co., 1570 South First Street, Milwaukee,** has been organized by John J. Frey, former owner of Precision Tool Co. and American Tool Co., to establish new shop for manufacture of tools, dies, jigs and fixtures.

**R. Perlick Brass Co., Milwaukee,** manufacturer of brewery supplies and other brass goods, which recently moved to larger shop space at 1825 West St. Paul Avenue, has filed articles increasing capitalization from \$50,000 to \$100,000 for expansion.

**Brillion Pulverizer Co., Brillion, Wis.,** has been organized to take over business of defunct Brillion Iron Works, conducting jobbing gray iron foundry and manufacturing soil pulverizers and foundry equipment.

**Curt G. Joa, Inc., Manitowoc, Wis.,** has been incorporated with \$25,000 capital by Curt G. Joa, Charles E. Brady and L. J. McCambridge, to manufacture paper converting machines. Production space has been leased in plant of Invincible Metal Furniture Co. for present.

**City Council, Racine, Wis.,** has voted referendum March 13 on acceptance of Federal loans for sewage disposal plant costing \$850,000 and storm sewer costing \$300,000.

## ◀ MICHIGAN DISTRICT ▶

**Manistee & Northwestern Railway Co., Manistee, Mich.,** plans rebuilding local engine house and machine repair shops recently destroyed by fire. Loss over \$65,000 with equipment.

**Shiawassee Coal Co., Ithaca, Mich.,** care of G. A. Giles, Alma, Mich., president, recently organized, plans development of coal-mining properties near Ithaca, with mining machinery, hoisting and conveying equipment, tipples, etc. Company is arranging for stock issue of \$125,000, considerable part of fund to be used for new plant.

**C. & S. Tool Co., 4091 Beaufait Avenue, Detroit,** has been organized by Clifford C. Stone, 12189 Flanders Avenue, and associates, to manufacture tools and other equipment.

**A. Haas Brewing Co., Houghton, Mich.,** is arranging for increase in capital from \$100,000 to \$175,000, part of fund to be used for increased capacity.

**Board of Trustees, Starr Commonwealth for Boys, Albion, Mich.,** has plans for new one-story vocational training building at institution. Marcus R. Burrows, 415 Brainard Street, Detroit, is architect.

## ◀ PACIFIC COAST ▶

**Southern Foundation, Ltd., 1209 East Fourteenth Street, Los Angeles,** has plans for four-

story addition to distillery. Cost over \$75,000 with equipment.

**Italian-Swiss Colony, 767-81 Beach Street, San Francisco, Enrico Prati, vice-president and superintendent,** plans extensions and improvements in winery at Asti (Sonoma County), Cal., including additional machinery. New units will be built. Cost about \$100,000 with machinery.

**Bureau of Supplies and Accounts, Navy Department, Washington,** asks bids until Feb. 27 for two electric furnaces (Schedule 1753), two reversible winches and spare parts (Schedule 1773) for Mare Island Navy Yard; one tractor, crawler or track tread type, with crane attachment (Schedule 1760) for San Diego yard; lighting and power cable (Schedule 1780) for Puget Sound yard; until March 2, one motor-driven pedestal disk sanding machine (Schedule 1787) for San Diego yard; until March 6, three motor-driven hacksaws (Schedule 1801) for Mare Island yard.

**Kitsap Brewing Corp., Port Orchard, Wash., L. E. Woolfolk, secretary,** has let general contract to Olson & Gustafson, Bremerton, Wash., for new five-story, and basement plant. Cost about \$85,000 with machinery. Carl Siebrand, 5016 Twenty-first Street, N. E., Seattle, is architect.

**City Council, City Hall, Portland,** has plans for new municipal airport on 400-acre tract on Barr Road, including two hangars, each three-unit type, with repair and reconditioning shops, oil storage and distributing buildings and other field units. Application has been made for Federal aid for \$1,085,700 for project. Claussen & Claussen, Guardian Building, are architects; Merritt H. Fuson, last noted address, is associate architect.

**Board of Trustees, Washington State College, Pullman, Wash.,** will take bids soon for new power plant for central service at institution. Cost about \$256,000 with equipment. Stanley A. Smith, Washington State College, is supervising architect.

**Bureau of Supplies and Accounts, Navy Department, Washington,** asks bids until Feb. 20 for five motor-driven boring, drilling and milling machines and spare parts (Schedule 1722) for Puget Sound Navy Yard; wire solder, tin-lead solder and spelter solder (Schedule 1659) for Puget Sound and Mare Island yards.

**West Coast Wineries, Inc., Ventura Avenue, Fresno, Cal.,** plans extensions and improvements, with installation of new bottling machinery, conveyors and other equipment. Cost about \$30,000 with machinery. Harry R. DeVenney is general manager.

**Independent Iron Works, 821 Pine Street, Oakland, Cal.,** has plans for one-story addition for storage and distribution.

## ◀ FOREIGN ▶

**Mexican Zinc Co., S. A., Mexico, D. F., and Saltillo, Mexico,** has secured concession from Federal Government for new zinc refinery and sulphuric acid works on local site. Plant will include power house, machine shop and other mechanical departments. Cost about 2,500,000 pesos (about \$700,000) with equipment.

**Secretary of Public Works, Supplies and Tenders Committee, Wellington, New Zealand,** asks bids until March 27 for outdoor switchgear, oil circuit breakers, air brake switches, transformers, gang-operated switches, bus bars and accessories, with steel structures for substations.

**Stewarts & Lloyds, Ltd., London, England,** is planning expansion and improvements at iron and steel works at Corby, Northamptonshire, including new steel and steel tube works and betterments in blast furnaces, iron ore handling and other facilities. A fund of £2,000,000 (about \$10,000,000) will be secured through debenture issue for buildings, equipment, etc.

**Peruvian Steamship Co., Ltd., Lima, Peru,** in conjunction with program of Federal Ministry of Public Works, will take bids at once from foreign companies for new 6000-ton floating dry dock on waterfront at Callao, including construction and repair facilities, 7-ton electric traveling crane, Diesel engines and auxiliary power equipment. Work is to be completed in nine months and will cost about \$450,000 with machinery. Unit will replace a structure which sank several months ago.

**Soviet Russian Government, Moscow,** plans new hydroelectric generating plant on Volga River, with substations, switching stations and transmission lines for power service to Federal industries in district. Entire project will cost over \$5,000,000. Amtorg Trading Co., 261 Fifth Avenue, New York, is official buying agency.



## The Answer is Good Gearing

To meet every requirement of quality and service, there is no substitute for good gearing. PERKINS Gears . . gears for every purpose . . are used by hundreds of manufacturers. Their answer to good gearing is PERKINS Gears.

### A HELPFUL CATALOG

Many pages in the Perkins 102 page catalog contain tables and gear calculation data. Mechanical executives and designers find this catalog extremely useful.

WRITE FOR YOUR COPY TODAY

## PERKINS MACHINE & GEAR CO.

147 CIRCUIT AVE.

SPRINGFIELD, MASS.

er \$75,000

ch Street,  
e-president  
s and im-  
(Sonoma  
machinery.  
t \$100,000

Navy De-  
til Feb. 27  
1753), two.  
(Schedule  
ne tractor,  
crane at-  
iego yard;  
1780) for  
ne motor-  
ne (Sched-  
March 6,  
ule 1801)

Orchard,  
has let  
Gustafson,  
story and  
with ma-  
twenty-first

has plans  
acre tract  
ars, each  
econdition-  
ing build-  
ation has  
\$5,700 for  
ian Build-  
ison, last

State Col-  
soon for  
at institu-  
quipment.  
e College.

Navy De-  
until Feb.  
lling and  
(Schedule  
re solder,  
(Schedule  
and yards.

a Avenue,  
improve-  
tling ma-  
ment. Cost  
y R. De-

ne Street,  
y addition

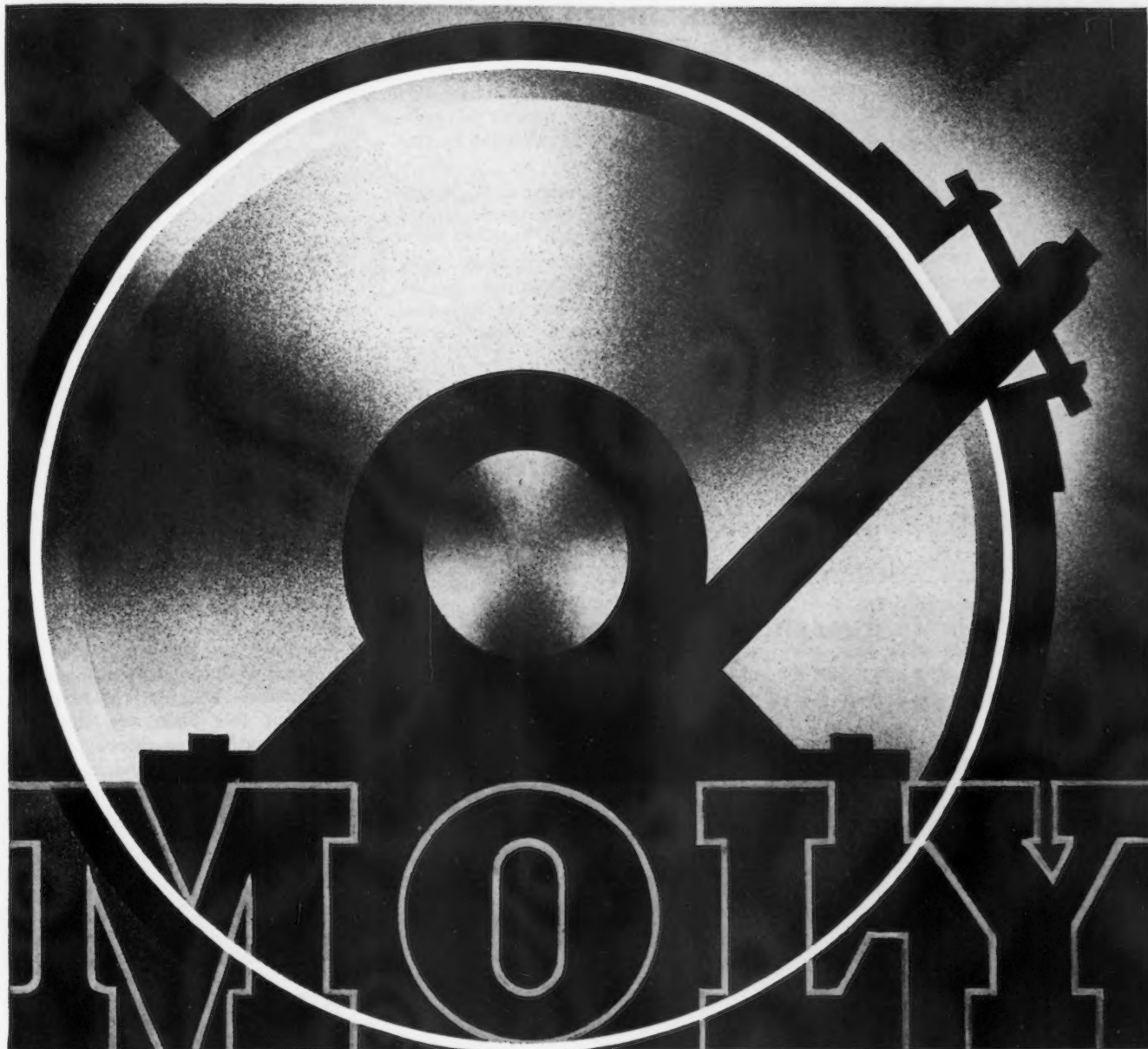
P. F., and  
ion from  
inery and  
Plant will  
and other  
2,500,000  
t.

plies and  
Zealand,  
or switch-  
switches,  
bus bars  
for sub-

England,  
ments at  
hampton-  
ube works  
iron ore  
nd of \$2,-  
e secured  
s, equip-

ma, Peru,  
eral Min-  
s at once  
6000-ton  
t Callao,  
facilities,  
l engines  
k is to be  
ost about  
l replace  
s ago.

ow, plans  
on Volga  
stations  
service to  
e project  
Trading  
is official



## for wear . . .

GREEK meets Greek when two wearing surfaces engage each other under vise-like pressure and heavy opposing forces. The brakes on traveling cranes and other hoisting machinery furnish an example. Based on replacement costs, it is usually the drum, and not the band lining, which comes out second-best. This is true not only with ordinary carbon steel but even with most alloy-steels and irons.

It's a different story when Molybdenum is added. Under any formula it improves wear-resisting ferrous products. Molybdenum imparts a hardness — without brittleness — obtainable with no other combination of alloys at a competitive cost. *Comparative service tests have shown Molybdenum grey iron outlasting the usual steel drum three times with no appreciable wear as yet.* The depth hardness imparted by Moly to iron has made this application possible by affording sufficient strength to withstand the enormous torsional load.

Evidence in another field shows one automobile manufacturer doubling the life of brake drums with the addition of only 0.20% Molybdenum. . . . And what is true of one form of application is true of others — be they brake drums, cast steel dipper teeth, flat machine bearings or what-not.

Wear resistance is only one of the many desirable qualities of iron and steel which thousands of service tests have demonstrated can be improved with Molybdenum. Have you a problem of equipment upkeep involving wear; torsional, vibrational or sheering stresses; creep, growth or heat resistance? The modern Climax laboratories in Detroit, with their free engineering service, are at your disposal. Meantime, write for our latest book on Molybdenum. Climax Molybdenum Company, 295 Madison Avenue, New York City.

**CLIMAX Mo-lyb-den-um**



## Effect of Facing on Quenching Efficiency

(Concluded from Page 17)

and gives an imperfect hardening of the steel.

On the other hand, if the specimen is quenched with facing, the cooling proceeds very quickly and continuously from the beginning to the end, as is shown in the figures. Again the difference in the cooling effects between the two cases depends upon the nature of the cooling liquid used. The difference is smallest in the case of refined rape oil and especially large

in that of hot water. Tests were also made with a large number of commercial quenching oils, but the results were exactly similar.

The accelerating effect of the facing on the velocity of cooling of a specimen during quenching has thus been experimentally confirmed. In addition, the facing prevents surface deterioration of the metal and also has some effect in inhibiting the formation of fine surface cracks.

put on all parts before the final assembly of the barrel. It is sprayed on, after which a conveyor carries the work through an oven in which it is baked at 350 to 400 deg. F. The coating leaves a glasslike film on the metal which is said to be impervious to alcoholic solutions and to weak solutions of alkali. It not only prevents corrosion of the metal but also acts as bond for the pitch required by the brewer.

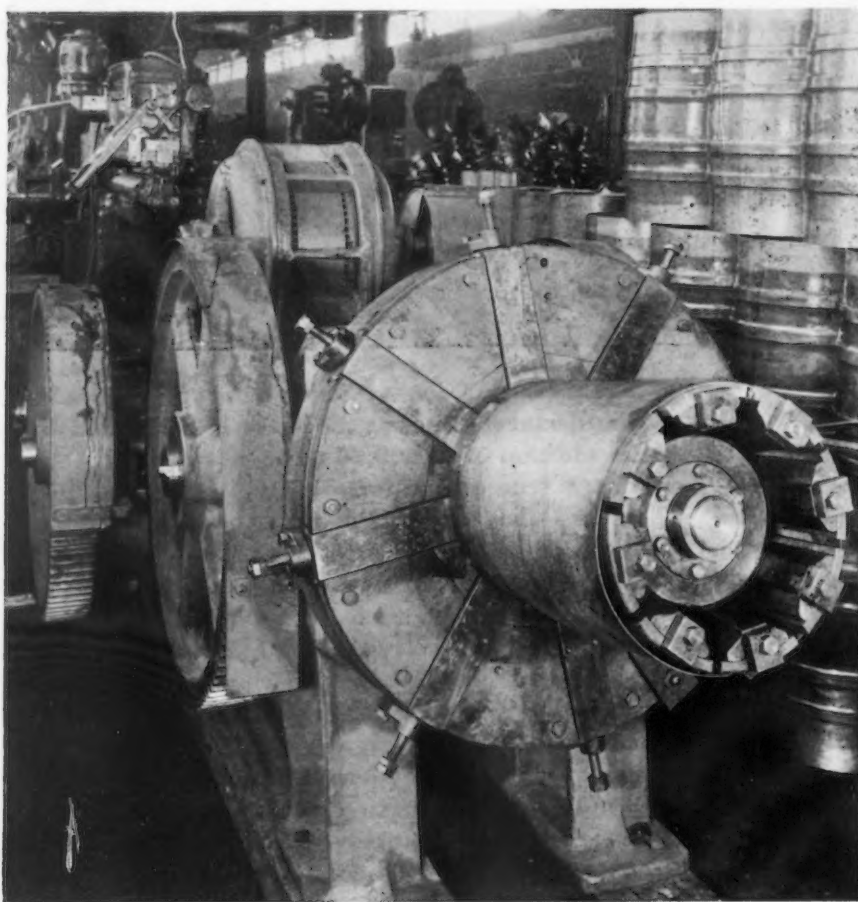
## New Type of Steel Barrel and Features of Its Manufacture

(Concluded from Page 20)

Bay of Fundy Seaweed. The heat transfer coefficient of this quilt is said to compare favorably with that of cork.

A new method of preserving the

metal has been developed by the Midland company. It makes use of a liquid protective sealer applied to the barrels to prevent rust and corrosion. The coating, as previously stated, is



The steel tube that forms the shell of the barrel, after the band is placed around the shell, is expanded in this machine into the shape of a barrel, causing a tight fit between the bilge of the barrel and the encircling band, so that welding of the band to the barrel is not required.

## Jobbing Shop for Heat Treating

(Concluded from Page 31)

solenoid valve in the gas supply line.

The high-speed-steel hardening department, on the second floor, contains a row of oil and salt draws along two walls and several box type furnaces arranged in two rows, in the center. There is also a broach or reamer furnace, similar to the one already described, and all are gas fired. The necessary oil, and water quenches are placed at intervals convenient to the furnaces. Many of the furnaces throughout this plant are equipped with automatic temperature controllers with both visual and recording pyrometers. As already stated there is a chemical and physical laboratory on this floor, including a photomicrograph installation.

## G-E to Build Large Waterwheel Generator

THE largest single-phase waterwheel generator ever built in this country is to be constructed at the Schenectady works of the General Electric Co., for use in connection with the electrification of the Pennsylvania Railroad. It is rated at 35,000 kva. The unit is being supplied to the Safe Harbor Water Power Corp. and is to be delivered and erected prior to Nov. 15.

Also for installation at Safe Harbor, the company is building four 20,000-kva. single-phase transformers at its Pittsfield, Mass., works, for delivery by Sept. 1. Weighing about 160 tons each, these transformers will be among the largest ever built at Pittsfield. They will raise the voltage from 13,000, the generation voltage, to 132,000, for transmission.

A high-tension transmission line will connect the Safe Harbor station to the Pennsylvania Railroad's own high-tension lines at Perryville, Md.

## JUST BETWEEN US TWO

### Thrown for a Loss!

IN an ambitious moment some twenty-odd years ago a giant brain connected with The Iron Age organization at the time gave the circulation department the grandiose title, "Reader Service Department."

Since then we have been the target of a steady stream of questions. Most of them fall within the line of duty and can be answered without too great a cerebral strain. Some are asked with an air of defiance, as if the questioner said, "You've been doing a lot of bragging about your information service. Now let's see you do your stuff," putting us in the uncomfortable position of the humorist who is told, "So you're supposed to be funny, eh? We dare you to make us laugh."

In such instances, we literally turn handsprings to preserve our reputation for omniscience. For instance, last week a reader asked, "When were the first rails rolled in the United States, and where?" Up to then we hadn't given it a thought, but after spending the best part of a morning reading through Swank's History of Iron and Steel, we were able to answer offhand and carelesslike, "In 1844, by the Mount Savage Iron Co., near Cumberland, Md."

But sometimes we are thrown for a total loss, as in the instance of the Johnson City, Tenn., war veteran, who wants us to help him get his discharge for services rendered in the war to end wars, also damages for a broken arm, leg and nose. Judging from his painful chirography, this particular war veteran is not much of a bookworm, but if he happens to have this read to him, he will be advised that our pull with the War Department is nil. We were not even able to get ourselves excused from the draft.

### Bouquet

A CALIFORNIA manufacturer of grading machinery writes: "There is more real 'meat' in your magazine for our business than anything else I know of."

### Bow Wow

A PENNSYLVANIA reader wants to know if we'll print a dog story, a most remarkable dog story, guaranteed to be true. Well, we hafta sorta keep within certain bounds and tie everything more or less to the industry. Now, if it happened to be about a lathe dog...

### Shoot the Works

AT intervals we oscillate between the belief that understatement pays and that it's plain foolish. We go off on a splurge of bombast; then we read somewhere that the soft pedal is potent and we're off on a spree of six point roman, till the inevitable reaction sets in, when we feel that maybe the power of understatement is greatly overstated.

We feel we're due for a change right now, so if you see us bragging all over the lot, blame it this time on the automobile makers. None of 'em is a blushing violet, and as an industry they seem to be getting along pretty well. Their motto seems to be, "When stronger superlatives are invented, we'll use 'em." We do recall several years ago something about, "Just a real good car," but it didn't last long. Maybe buyers took the maker at his word and bought any one of "absolutely-the-wonder-car-of-the-age" makes.

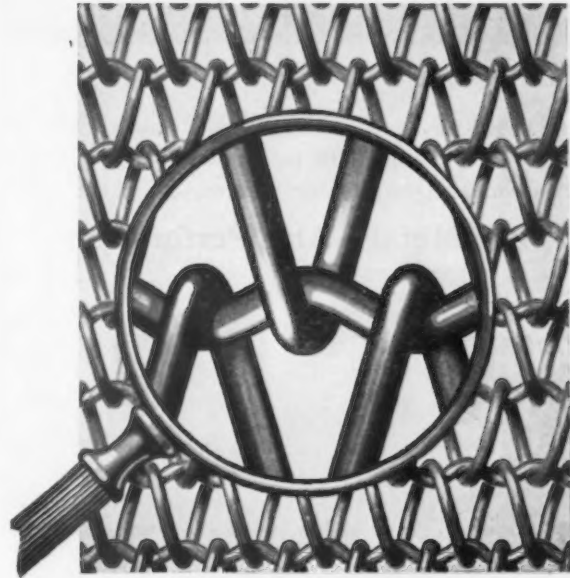
So away with Milquetoastish deprecatoriness. Here's a handful of brash, boldface statements, brazen but bona fide:

1. In 1933 The Iron Age published 65% more advertising than any other metal-working paper.
2. The Iron Age has the highest subscription renewal percentage of any metal-working papers of more than 3,500 circulation.
3. In 1933 The Iron Age entered more subscriptions (new and renewal) than did any other metal-working paper.
4. In 1933 The Iron Age published more editorial pages than did any other metal-working paper.

### Pipe 'Em Down!

THE current vogue among radio announcers of delivering prosy advertising announcements with an artificial air of breathless excitement will probably be shortlived, so don't break up your radio set yet. Funny the sponsors themselves haven't discovered how ludicrous the "crucified-on-a-cross-of-gold" tone sounds when plugging cake, toothpaste, cigarettes, and so on.—A.H.D.

## Study It!



### THE BALANCED SPIRAL CONVEYOR BELT

Patent applied for

Yes it's new... the most flexible belt yet devised. The spirals are not restricted by being woven into each other but work freely on a crimped reinforcing strut. The crimped member prevents shrinkage of width thus eliminating tendency toward elongation in the belt. It runs true due to alternate spirals woven right and left. This belt has all desired qualities... flexibility, true running, flatness and ability to hold its width and lengths all contributing to the longest possible service life. It can be made in all sizes of any kind of metal. Let us send you a questionnaire to fill out so that we know exactly the service. We can then scientifically recommend a belt that will give you real satisfaction.

Wickwire Spencer Steel Company, 41 East 42nd Street, New York City; Buffalo, Chicago, Detroit, Philadelphia, Tulsa, Worcester; Pacific Coast Headquarters: San Francisco; Warehouses: Los Angeles, Portland, Seattle; Export Sales Dept.: New York City.

## WISSCO CONVEYOR BELTS

Wickwire Spencer Steel Co.  
41 East 42nd St., New York City.

I would be pleased to receive one of your new Handbooks on Metal Conveyor Belts.

Name .....

Company .....

Address .....IA

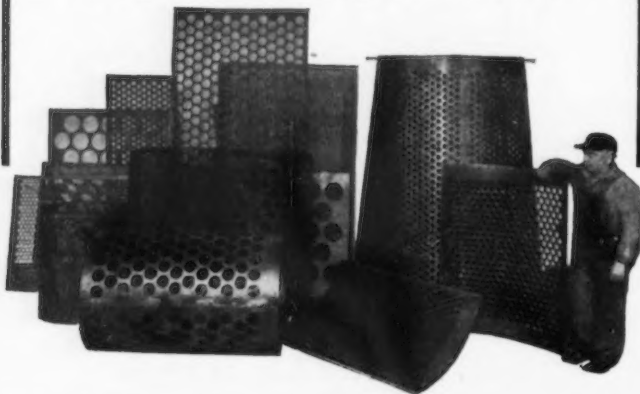


# SCREENS of Perforated Metal

For a Thousand Uses

For Grain, Minerals, Chemicals or any other material to be screened  
Ornamental Designs for Grilles, Cabinets, etc.

Any Metal—Any Perforation



**The Harrington & King Co.**  
PERFORATING

5657 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N.Y.

## HENDRICK PERFORATED METALS

Perforated Metal Screens in steel, bronze, Stainless Steel, Monel, Aluminum, Everdur and other metals. Perforated Grilles in various metals and many special designs.

Mitco Open Steel Flooring, Mitco Shur-Site Treads, Mitco Armorgrids; also elevator buckets, conveyor troughs and products fabricated from heavy plate. Write for catalog.

**HENDRICK MFG. CO.**

37 Dundaff Street Carbondale, Pa.

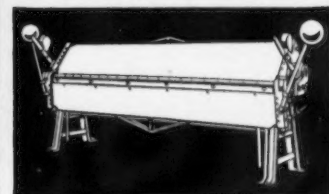
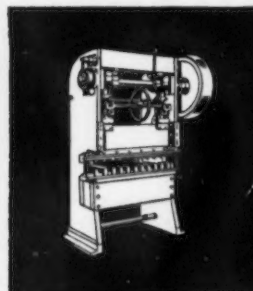
Baltimore Birmingham Boston  
Cincinnati Cleveland Detroit Hazleton  
New York Philadelphia Pittsburgh

## GET IN THE HABIT

*of reading and using the  
classified sections—they  
are full of opportunities.*

## CHICAGO

BUILT OF STEEL



BRAKES, PRESSES AND SHEARS

**DREIS & KRUMP MFG. CO.**

7430 LOOMIS BLVD.

CHICAGO, ILL.

## V & O POWER PRESSES AUTOMATIC FEEDS

AUTOMATIC THREADING MACHINES

THE V & O PRESS CO., HUDSON, N. Y.

## THE QUICKWORK COMPANY

H. Collier Smith, Jr., President ST. MARYS, OHIO

**"QUICKWORK"**

(REGISTERED IN U.S.A. AND FOREIGN COUNTRIES)

EQUIPMENT FOR STRAIGHT, IRREGULAR, CIRCULAR AND ELLIPTICAL CUTTING, BEVELING AND FLANGING OPERATIONS  
CABLEGRAMS "QUICKWORK" ALL CODES

## Cone 4-Spindle Automatics

Are economical and accurate producers of screw machine parts up to 6" diameter 7" milling length. They cut costs, increase production, boost profits.

Write for particulars

**CONE AUTOMATIC MACHINE CO., Inc.**  
WINDSOR, VERMONT

REPRESENTATIVES:

Detroit: J. C. Austerberry's Sons, 634 E. Congress St., Detroit, Mich.  
Chicago: John H. Glover, 2127 North Sayre Ave., Chicago, Ill.  
Ohio: S. B. Martin, 1077 Erie Cliff Drive, Lakewood, Ohio.  
New England: Potter & Johnson Machine Co., Pawtucket, R. I.  
Indiana: G. A. Richey, Chamber of Commerce Bldg., Indianapolis, Ind.  
New York State: Syracuse Supply Co., Syracuse, N. Y., also Rochester, N. Y.  
Pennsylvania: Arch Machinery Co., 1005 Park Bldg., Pittsburgh, Pa.  
Philadelphia: Lloyd & Arms, Inc., 133 South 36th St., Philadelphia, Pa.  
California: C. F. Bulotti Machinery Co., 828-831 Folsom St., San Francisco, Calif.

## WELDING MACHINES 1/2 TO 100 K.V.A.

FOOT OPERATED—MOTOR DRIVEN

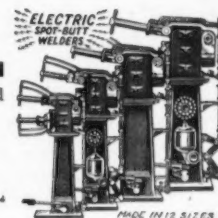
For welding metals having a combined thickness from .001 in. to .500 in.

Welders as low as **\$35.00**

**EISLER ENGINEERING CO., Inc.**

754 SO. 13th ST. NEWARK, N. J.

DISTRIBUTOR AND DEALER CONNECTIONS DESIRED



## IF A COMPANY IN YOUR LINE

has found a better way of doing a thing, the probabilities are that your business paper tells about it.